DETERMINANTS OF COMMODITY MANAGEMENT PRACTICES IN PUBLIC HEALTH FACILITIES IN DEVOLVED HEALTH SYSTEMS: A CASE OF ESSENTIAL MEDICINES IN MAKUENI COUNTY, KENYA

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DECLARATION

I, declare that this thesis is my original work and has not been presented for a degree or any other award in any other university

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DEDICATION

This thesis is dedicated to the Health Systems Management community for the contribution that it has made to the growth of the sector.

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ABSTRACT

The rationale for decentralization of health sector enabled lower level governance structures to design health sector interventions using innovative models that are context-specific and that take into consideration the unique health needs of different localities and encourage effective and active citizen engagement. The governance structures are able to facilitate autonomous and expeditious decisions regarding management and mobilization of resources efficiently. However, the health function in almost all counties is affected by significant challenges. Top among them being poor management of essential medicine leading to frequent stock-outs. Essential medicine is one of the six pillars of health systems and plays a key role in ensuring the population remains healthy. This research therefore aimed at analyzing some of the determinants of good management practices in the field of essential commodities especially medicines in publicly owned health facilities in a devolved system. The specific focus of the research was on the impact of healthcare worker training, policy and institutional framework, healthcare budgetary allocations and available infrastructure on effective management of essential medicines in publicly owned health facilities in a devolved system. The researcher used descriptive cross-sectional research design and a mixed method of qualitative and quantitative data collection techniques in collecting both primary and secondary data. The study population was all the health facilities in Makueni County. The study population comprised pharmacist, procurement officer, nurses, laboratory staff, clinical officers, and bio medics and stores clerks in each of the health facilities. The study adopted a stratified random sampling procedure to choose targeted 50 public health facilities in Makueni County from a population of 162 health facilities. The calculated size of the sample was 96 respondents. The sampling technique used was stratified sampling in selecting the sample according to various categories of health facilities. The researcher used a questionnaire and key informant interview guide as the main research instruments. Analysis of data collected was through qualitative and quantitative methods with the presentation done using tables, charts and narration for qualitative data. The study findings established that health worker training (β=3.232, p-value= 0.000), healthcare budgetary allocations (β=2.185, p-value= 0.008) and available infrastructure (β=5.296, p-value= 0.000) had significant and positive effect on management practices of essential medicine in Makueni County, Kenya. However, the effect of policy and institutional framework (β=1.374, p-value= 0.093) was found to insignificant in predicting the management practices of essential medicines in Makueni County. The study concluded that healthcare sector is a dynamic sector that faces different on a daily basis, health worker training, policies and institutional structures, budget allocation and infrastructure need to be advanced to meet the expectation in the evolving healthcare sector. The recommendations of the study included that County Government of Makueni through its ministry of health in collaboration with its counterpart at national government should work in collaboration on ensuring adoption of emerging best practices in management of essential medicines.

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ABBREVIATIONS AND ACRONYMS

CHWs   Community Health Workers

EMLs   Essential Medicines Lists

HSM   Health Systems Management

ICT   Information and Communications Technology

KeMU   Kenya Methodist University

NACOSTI   National Commission for Science Technology and innovation

NHIS   National Health Isurance Scheme

NPDs   Non-Program Drugs

SAQ   Self-adminstered Questionnaires

SERC   Scientific and Ethical Review Committee

STG   Standard Treatment Guidelines

TQM   Total quality management

UHC   Universal Health Coverage

WHO   World Health Organization

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Essential medicine is one among six pillars of health systems and plays a key role in ensuring the population remains healthy. This research therefore aimed to analyze some of the determinants of good management practices of essential medicines in publicly owned health facilities in devolved systems in Kenya. This section reviews the background information of effective essential medicine management practices from the global perspective to the local. The chapter further highlights the problem statement and the objectives that guided the research.

Good health commodities management is an essential component of effective and affordable health care services globally. Within a decade after the first modern pharmaceuticals became available, efforts began to ensure their widespread availability (Adzimah et al, 2014). From the mid-1950s to the mid-1970s basic health commodities concepts began to evolve in countries as diverse as Cuba, Norway, Papua New Guinea, Peru and Sri Lanka. Over the last 20 years countries have acquired considerable experience in managing health commodities supply. Broad lessons that have emerged from this experience include: that national drug policy provides a sound foundation for managing health commodities; that wise health commodities selection underlies all other improvements; that effective management saves money and improves performance; that rational drug use requires more than drug information; and that systematic assessment and monitoring are essential (Adzimah, et al 2014).

Commodity management practices of pharmaceutical products are important in maintaining and providing health services to the population (Koh et al, 2013). Since the Constitution of Kenya was promulgated in 2010, the health sector was devolved

and counties have been mandated to adopt the best practices to see to it that quality healthcare services are provided to the public, which start with provision of essential medicines in all the public health facilities. The World Health Organization (WHO, 2007) avers that essential medicines would comprise the category of medicines which satisfy priority health needs of a population and should remain available in the context of a properly and effectively functioning healthcare system; in amounts that are adequate, dosage that is appropriate and with assured quality for an affordable cost (WHO, 2002).

According to WHO (2007) in addition to being effective, a properly functioning healthcare system must assure equitable access to medicines considered essential, technologies and vaccines which are of guaranteed, safety, quality, cost-effectiveness, and efficacy and are scientifically verified for use. According to Kenya Medical Supplies Agency (2008) this pillar deals with management of medical supplies and medicines to enable reliable commodities be delivered in the right quantities, at the right time, place and are used rationally.

Healthcare provision involves, promotive, curative, preventative and rehabilitative care. Further, curative, preventative and rehabilitative care involve the utlization of medicines and medical supplies. For the healthworkers to provide effective curative services, it ismportant that medical supplies and essential medicines remain available in all healthcare facilities. In addition to skilled health workers, medicines are the most importantant ingredient in preventing, alleviating, and providing curative service. (United Nations [UN], 2005).

The supply and management practices of drugs are observed to be in a cycle. The Cycle includes selection of drugs, their quantification, procurement, to storage and their eventual distribution. Selection of drugs for procurement should be based on the National Essential Drugs List. This list is perdiodically reviewed taking into account the changing contexts within the larger sector. For procurement of these medicines, a competitive process is usually undertaken under the Public Procurement Law which, among other things, ensures these are provided at acceptable quality and at the lowest possible cost when needed. Proper storage of drugs is critical in avoiding waste and deterioration. The process also ensures quality assurance, monitoring and improving the drug management cycle.

Essential medicines as explained in the 1977 concept by WHO are medicines which address the priority healthcare care needs in a population. These medicines are intended to be available and accessible at all times in appropriate amounts, correct dosage, in assured quality, with relevant and adequate information. Moreover, availability of these medicines is a key element of quality from the client perspective, and it is a key factor in assessing quality of the services (Chuchu, 2002). Since the creation of devolved system of government, many counties have had several setbacks in adoption effective management practices of essential medicines and medical supplies which results to unavailability of essential medicines at the time of need. It has been found that essential medicine stock-outs are common in publicly owned healthcare facilities (Mecca, 2014).

The concept of effective management practices of essential medicine is global and has been addressed in various ways. India, for instance, the second most populous country

in the world, has about 50-65% (500-650 million people) with no access to essential medicines. Bruno *et al.,* (2015) opines that the idea of essential medicines was proposed by WHO in 1977. WHO further estimates around 30 percent of the global population (constituting 2.1 billion people) does not have access to essential medicines.

There was a study which was done at the global level on essential medicines and which revealed that the median value for availability of the essential medicines was below what was considered optimal at 61.5 percent, but considerably higher than other non-essential medicines which was found to be 27.3 percent. The study further revealed that the median availability of essential medicines in the public healthcare facilites was at 40 percent but at 78.1 percent in the private sector. As for non-essentail medicines the median availbility was at 6.6 percent and 57.1 percent for public and private health faciliteis respectively. A negatively correletated relationship between incomes at the national level categories and essential medicines availability was established in the public healthcare sector. The Essentail Medicine Lists have impacted on the provision and utilization of these medicines and also enhanced their availability compared to non-essential medicines especially in the public healthcare sector in lower middle and low income countries. Even with increased accessablity of essential medicines in the public healthcare sector, this may still not guarantee equitable access to these important commodities (Bazargani *et al.,* 2014).

The lack was observed to be highest among the global economically deficient countries in Africa and Asia. Within those countries, half of the population cannot access these medicines. Whereas signifcant progress was registered over the time that

WHO has been championing the idea of essential medicines, it is noteworthy that the benefits have not been equitably realized across the population (Attaran, 2008). A third of the global population is unable to have access to these medicines.

Almost half of the population in Africa, equivalent to 15 percent of the global population has no access to essential medicine (WHO, 2004a). In 2011, WHO carried out a study which *inter alia*, found inadequate availability of medicine, especially in the publicly owned health facilities, is a major barrier to access of these medicines. The study also found that availability of generic drugs in public health facilites is less than 60 percent across WHO regions. This ranges from, 32 percent and 58 percent in the Eastern Mediterranean and European Regions respectively. Availability of medicines, however, is below 60 percent in the South- East Asia, Africa and Western Pacific Regions (WHO, 2011).

The World Health Organisation (WHO, 2015) estimates that over 260 million people within Africa do not have access to the essential medicines, which has worsened their vulnerability and made them inordinately exposed to high risk of mortality (Liu *et al.,* 2012). Zuma (2013) established that factors militating against availability of essential medicines include: ineffective delivery system from designated depots; poor stock management of medicines; inadequate numbers of pharmaceutical personnel in the healthcare facilities; unavailability of the user-friendly electronic system for commodity management; and, the existence of separate pharmaceutical services and medical depot within the geographical regions.

The reasoning behind devolving the health sector was to allow lower levels of governance structure to design context-specific interventions that are based on

innovative models which respond to unique health needs, encourage effective citizen engagement, as well as make independent and expeditious decisions involving mobilization and management of resources. In most counties, however, the health has experienced serious challenges which included: capacity gaps; human resource deficiency; serious lack of supportive institutional and legal infrastructure; run-away corruption; and the presence of an adversarial relationship between counties and the central government (Kimathi, 2017).

A study which was conducted in middle and low income countries which included Kenya found a siginificant variability on average medicine availability at 20 percent and 45 percent in the public and private sector facilities respectively (WHO, 2010). A study among publicly owned facilities in Kenya also found that there were frequent stock-outs especially affecting essential medicines at an average of 46 days every year (Ministry of Public Health & Sanitation and Ministry of Medical Services, 2009). In order to better the health system of the Country, it is important to enhance access to essential medicines in dealing with health complications while reducing mortality in the developing world (Liu et al., 2012). Okong'o and Muturi (2017) found that within most of the sub-county and county hospitals, there was, on average, about 50 percent of essential medicines available in the facilities while in other lower facilities, this was at 60 percent stock of essential medicines.

Numerous public facilities have been dealing with acute shortages of drugs which forces hospitals to utilize resources earmarked for development of the facilities to procure emergency medicines from locally available sources including pharmacies. For example, data acquired from a pharmaceutical agency showed that over 201 sub

district, district and provincial hospitals within Nakuru County had an average of 50 percent stock for common class medicines, with the lower-level health facilities having an average of 60 percent of essential medicines in availale within the faciltiies (Ministry of Health [MoH], 2010).

1.1.1 Makueni County Health System

Makueni County was established in 2010 when the Constitution of Kenya was promulgated. The county is situated in the former Eastern Province of Kenya with a population of 989,500 (2017) and an area of 8,009km^2. It has 60 sub-wards and eight sub-county hospitals that are supported by one county referral hospital. Makueni County government has a functional and highly successful in piloting the universal health coverage program which was started in 2016. The County has 12 operating theatres among other county hospitals.

Universal Health Coverage (UHC) aims at ensuring that all people in a given population are able to utilize preventive, promotive, curative, as well as rehabilitative and palliative healtcare services which are needed, in adequate quality, while ensuring the utilization of the services does not put them at risk of financial hardship (Okech, & Lelegwe, 2016). UHC is based on the WHO constitution of 1948 which declared health to be a fundamental human right. It is also undergirded by the Health for All Agenda as espoused by the Alma-Ata Declaration, 1978.

The high levels of poverty, 60% by 2016 led to the piloting and the consequent starting of the UHC program. From the pilot expenses of Ks. 138 million, 15% went to laboratory, 24% to inpatient and 33% to pharmacy expenses, with the essential medical supplies taking the huge chunk of the expenses. Members of the county are expected

to contribute Ksh. 500 per year for a nuclear household. The Universal Health Coverage Program increases access to free medical services in any of the County Hospitals. UHC program has reached over 45,000 households in the County where registered members are issued with the Makueni Care Card. Members aged 65 years or above have been exempted from the Ksh. 500 charge and thus are attended to free of charge.

Through the universal healthcare program, the health system has seen an increase by 70% of inpatient services and a 40% increase of outpatient services (Muasya, 2018). It is expected that through the universal healthcare programs, the influx of patients led to deliberate investments in medical supplies to avoid shocking the healthcare system. In the financial year 2016/2017, the Makueni County government allocated Ksh. 200 million with the amount increasing in the subsequent years. The subsequent two years saw an increase to Ksh. 250 million and Ksh. 300 million in 2017/18 and 2018/19 financial years. The increase in funding shows the increase in the medical supplies expenditure that also reflects the increasing uptake of health services by the county residents (Muasya, 2018).

This building block has inherent weaknesses including stock-outs and medicine shortages. This can potentially affect other health functions adversely including service delivery within the country's health system (Bigdeli *et al.,* 2014). These stock-outs of medicines can be caused by widespread factors especially because the medicine supply chain is a fairly complex process which involves numerous players. The complexity of the medicine supply chain processes is in part responsible for the stock-outs that have been witnessed in many facilities (Hensen *et al.,* 2011). Mitigation

measures, however, should be introduced at the level of healthcare facilities where these services are offered in order to significantly reduce the many cases of stock-outs.

In many cases, the causes have been linked to challenges which are embedded in the adopted commodity management practices (Bateman, 2013). It is therefore imperative to continually evaluate and improve systems for provision of medicines to ensure seamless and uninterrupted access to these medicines (Lufesi et al, 2007). From evidence of ineffective management practices of commodities including essential medicines in public healthcare facilities and frequent challenges in medicine shortages in counties in Kenya, the need for effective commodity management practices remains a priority especially among the county governments.

1.2 Statement of the Problem

Despite existence of Standard Treatment Guidelines (STG) and updating of National Essential Medicines List (EML) on management of essential medicines public facilities still have serious challenges in management of essential medicines (Kimathi, 2017). This has caused inefficient, unreliable, ineffective and unaffordable healthcare services and in other cases, inordinately increased morbidity and mortality because of lack of appropriate effective treatment. Counties are having to learn to develop needed competencies in management of the essential medicines. Shortage of medical supplies in government health facilities has tended to push patients expecting more affordable government-subsidized services to instead visit private health facilities despite costs being relatively higher (Magak & Muturi, 2016).

Frequent shortages of essential medicines among many public facilities significantly increases the Country's morbidity and mortality rates since these facilities provide

services to majority of the population in the low income bracket and who largely depend on subsidized healthcare services promised in government facilities. Procurement and management of essential medicines in many counties continues to be a challenge for many public facilities in the Country. The shortage of the medicines in government health facilities affects uptake of services from government health facilities from where subsidized services are expected. (Magak and Muturi, 2016). In Makueni County, private chemists are thriving alongside government facilities because many patients get prescriptions for medicines but cannot find those in the public health facilities and have to buy from private chemists.

Previous studies in this area such Magak and Muturi (2016) and Kimathi (2017) have focused on broad determinants affecting availability of essential medicines in public facilities. There is scarce knowledge and limited attention on commodity management practices and their determinants. The current study sought to address this research gaps since availability of essential medicine is the outcome of the commodity management practices adopted by the health facilities. The study sought to address the question what are determinants of commodity management practices adopted by health facilities in devolved health system in Kenya?

1.3 Main Objective

To investigate the determinants of commodity management practices of essential medicines in public health facilities in Kenya.

1.3.1 Study Objectives

The objectives of the study were:

i. To analyse the influence of health workers training on commodity management practices of essential medicines in public health facilities in Makueni County.

ii. To establish the influence of policies and institutional framework on commodity management practices of essential medicines in public health facilities in Makueni County.

iii. To establish the influence of healthcare budgetary allocations on commodity management practices of essential medicines in public health facilities in Makueni County.

iv. To assess the influence of available infrastructure on commodity management practices of essential medicines in public health facilities in Makueni County.

1.4 Research Questions

The study was guided by the following research questions;

i. To what extent does the health worker training affect commodity management practices of essential medicines in public health facilities in Makueni County?

ii. How does policies and institutional framework affect commodity management practices of essential medicines in public health facilities in Makueni County?

iii. What is the effect of healthcare budgetary allocations on commodity management practices of essential medicines in public health facilities in Makueni County?

iv. How does available infrastructure affect commodity management practices of essential medicines in public health facilities in Makueni County?

1.5 Justification of the Study

There is insufficient evidence of systematic empirical study on causal relationship between health worker training, policy and institutional framework, and healthcare budgetary allocations available infrastructure on effective management of essential medicines in government health facilities within a devolved governance system. In Kenya, management of essential medicines has significantly shifted because of a new constitutional and legal regime that altered the organization of the health system in the Country (Kimathi, 2017). With the implementation of UHC still being piloted in four counties namely Kisumu, Machakos, Isiolo, and Nyeri, it is instructive that sufficient evidence be documented to guide the eventual full rollout of UHC in Kenya (Okech, & Lelegwe, 2016).

The study may be able to establish the various variables and how these can be manipulated to achieve optimal service levels for the population. Before the new devolved system in Kenya in 2021, public facilities had limited autonomy especially in the management and utilization of out-of-pocket and other insurance-based revenues which were generated in the faciliies. Significant proportion of the funds would be allocated to procurement of essential drugs (Muasya, 2018). It therefore becomes imperative to undertake this study in order to recommend practical solutions to the challenges identified.

1.6 Limitations of the Study

Since the study relied on primary data honest of the respondent was a major limitation of the study. Some of the respondents lacked the authority to provide information required since it was not within their dockets. Others feared to provide sensitive information which they thought may have jeopardized their jobs. Also, whereas the

statistical analysis sought to explain correlation between variables under study, it may not sufficiently explain causation.

1.7 Delimitations of the Study

The study only focused on one county government out of the 47 county governments established after promulgation of the constitution 2010. The study was delimited to Makueni County, having successfully piloted the universal health coverage programme and therefore ideal for the study.

The study only used a cross-sectional study design and, due to cost and time constraints, was not able to adopt a longitudinal study to measure the effects of various interventions e.g training over time. However, the cross-sectional design has been found to be effective in similar studies. The study focused only those who are directly concerned with the essential medicines supply chain, while leaving out other staff who may also have some level of information regarding management of essential medicines. The study suggested further research to focus on other counties as they continue adopting effective management practices of essential medicines.

1.8 Scope of the Study

The scope of the study covered Makueni County in 2019 and covered the sub-county hospitals and the county referral hospital. The focus of the study was on determinants of commodity management of essential medicines in Makueni County. The specific focus of the study was on effect of health worker training, policy and institutional framework, and healthcare budgetary allocations and available infrastructure on commodity management of essential medicines in public facilities in a devolved

system. The population and sample size of the study was derived from health workers in level 2, 3 4 and 5 health facilities in Makueni County.

1.9 Significance of the Study

The study is expected to benefit different stakeholders including scholars, health planning experts, development partners and the government, both county and the national one. Also expected to borrow from the study are private investors in healthcare systems. Scholars may benefit from the findings and other scholarly information that the study may add to the academic literature. The governments may be able to know the factors that need to be controlled to ensure proper stocking of the essential medicines at the counties and at the national referral hospitals. Health planning experts may benefit from understanding the factors that influence the medical supplies and being able to effectively plan for the adequate supply of medicine throughout. Private investors in healthcare may also benefit from the study in that they may be able to get the information and the key factors that influence supply of medicine at the county hospitals.

The study is expected to transform the commodity management of essential medicines in public health facilities the devolved health system for the delivery of quality health services, generate new knowledge in management of essential drugs and supplies, inform policy on managing in management of essential drugs and supplies for health in a devolved health system and contribute towards strengthening health systems in the Kenya.

1.10 Assumptions of the Study

The study assumed that the Makueni County government performs the function of ordering and stocking essential medicines at the county, an aspect that is devolved under the Constitution of Kenya, 2010. It is also assumed that the county experiences all the factors expected to influence supply of the essential medicine including budgetary allocations, stock levels, health staff training, and the prevailing disease trends. It is also assumed that the selected respondents were reliable and honest with their responses.

1.11 Operational Definition of Terms

Commodity Management is the overseeing of logistics function in receiving, storage, transportation and distribution of commodities along with maintaintenance of commodity accounts and documents, preparation of important commodity reports and keeping the losses to an acceptable minimum.

Commodity Management Training refers to any formal or informal training carried out to enhance knowledge, skills and attitudes in commodity management.

Essential Medicines implies medicines which satisfy healthcare needs considered a priority in a population and which should be available in a well-functioning healthcare system, in adequate quantities, appropriate dosage and with assured quality at affordable prices.

Health Worker refers to a qualified professional properly trained to administer health care services.

Healthcare refers to provision of curative, promotive, rehabilitative and preventative care.

Infrastructure is understood to be basic physical and organizational structures and facilities (e.g. buildings, roads, power supplies) required for the operations of the society or enterprise.

Policy and Institutional Framework is a system of laws, procedures, regulations, informal conventions, customs, and norms that shape socioeconomic activity and behavior.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The chapter presents a review of literature which covers the theoretical framework, empirical literature, the conceptual framework and the research gaps. The theoretical review presents the theories that anchor the study; empirical review gives the review of other previous studies while conceptual framework gives the figurative relationship between the variables.

2.2 Empirical Review

This section presents a review of other related studies of a similar theme as that of this study. The section has presented studies per objective. Based on these studies, a critique has been established to come up with the research gaps which this study seeks to fill.

2.2.1 Health Worker Training and Commodity Management Practices of Essential Medicines

Mezid (2014) assessed the pharmaceutical logistics system in health centres of Addis Ababa, Ethiopia giving emphasis to non-program drugs (NPDs). The researcher conducted a facility-based cross-sectional survey through qualitative methods. A focus on 24 facilities through key informant interview revealed that on average, only 47.52% of the health facilities received the full quantity of non-program drugs they ordered. From the in-depth interview, all the participant in the interview agreed that the competence of the health workers in commodity management as well as the mode and time of financing was important in ensuring that the non-program drugs were well managed. It was presented that limited capacity contributed for the stock outs.

Muiruri (2017) conducted a study to determine the health worker training and effective management practices of essential medicines in Meru County. The study conducted a survey of 94 selected public health facilities in the county. Through the use questionnaires and interview, both quantitative and qualitative data was used. The findings obtained from regression analysis indicated that commodity trainings had been conducted to enhance the management of essential medicines. This also had a positive influence on management of Essential Medicines.

A study was conducted in Ethiopia, Malawi and Rwanda to find out what factors affected availability of various essential medicines for Community Health Workers (CHWs). Using a survey and qualitative approach, the study established that CHWs training was critical in management of essential medicines. It was realized that up to 95 percent of CHWs managing health products in Rwanda and Malawi had received some level of training in commodity supply chain topics. In Ethiopia, however, only 10 percent of CHWs reported having been trained.

A study Adzimah, *et al* (2014) focused on an assessment of health commodities management practices in health care delivery. The study found that many developing countries spend sizeable sums on the purchase of health commodities yet an estimated 60–80% of their populations; particularly in rural areas do not have constant access to even the most essential health commodities. The regular provision of adequate amounts of appropriate health commodities is crucial if health services are to be effective and credible. Lack of capacity in handling of essential commodities was found to be among the factors that significantly affected the essential commodity management.

2.2.2 Policy and Institutional Framework and Commodity Management Practices of Essential Medicines

In a study on developing effective and sustainable systems for procurement of essential reproductive health commodities, Cohen (2011) interrogated the institutional frameworks available in various public sector settings of developing countries. The study was a descriptive survey where primary data was used. Through descriptive analysis, it was determined that the main factors which are critical for effective procurement of essential reproductive health supplies are the institutional infrastructure; regulatory and policy environment; leadership at the government level; transparency and financing.

Zimbulu (2013) conducted a study to establish the institutional and legal framework for effective management practices of essential medicines in Kenya, through a cross sectional study of 3 county referral hospitals in Nairobi County. In the study, methods adopted included mixed methods research where both qualitative and quantitative data was collected by use of questionnaires and interview guides. It was established that among other factors, the institutional framework regarding guiding policies, Financing and procurement were significant factors in having effective management practices of essential medicines in Kenya.

Another study was conducted by Kimathi (2017) to determine the challenges experienced in a devolved healthcare sector in Kenya. The study conducted a survey across the counties in Kenya to find out the problems which the counties faced in the health sector. A descriptive approach was adopted by the study. The descriptive findings indicated that the counties face challenges which include human resource deficiency, capacity gaps, lack of supportive legal and institutional infrastructure, run-

away corruption and an adversarial relationship between the county and national government. The challenges resulted in the stagnation of provision of health services and possibly a reversal of gains as indicated by health indicators.

Meeme et al (2015) focused on inventory management practices for essential drugs at public and mission hospitals in Meru County. The study concluded that mission hospitals performed better than public hospitals in all aspects of inventory management. This is significant and considering that health care workers use essential drugs to deliver quality services to the clients. Patient visiting mission hospitals were likely to get all prescribed medicine which was a measure of quality on patient perspective than patient seeking health care from public health facilities.

2.2.3 Healthcare Budgetary Allocations and Commodity Management Practices of Essential Medicines

Rao et al (2009) conducted a study to determine the factors which are critical in ensuring there is effective essential medicine management through the commodity supply chain and the type of human and organizational capabilities needed to discharge these functions. The study focused on the US public health sector. The study also investigated a range of available financing mechanisms for the same and other options to support the management of essential medicines. Through rigorous inferential interrogations, the paper cited technical capacity, financing and institutional infrastructure as the key elements of an effective system to manage essential medicines in developing countries.

In Ghana, a study was conducted by Ashigbie et al (2016) to establish the challenges of commodity management (especially medicines) in the government and private

sectors under the National Health Insurance Scheme by use of a qualitative study. The study focused on healthcare facilities in the Eastern and Volta regions as well as Greater Accra in Ghana. The findings from the interviews indicated that some of the frequently cited concerns across health facilities in the regions were the inordinate delays in receiving the National Health Insurance (NHIS) reimbursements, coupled with low rates for disbursements especially for medical items which caused providers to seek co-pay from patients.

Magak and Muturi (2016) focused on the factors which impact on stock levels of essential medicines in government health facilities in Kisii County. A descriptive study design was used in studying the nine sub-county hospitals in Kisii County. Qualitative and quantitative data was collected using self- administered questionnaires, interviews and observation. The study established that half (49.1%) of factors causing changes in essential medicine availability can be attributed to qualification of staff, ICT, design of supply chain,, financing, monitoring and mechanisms that facilitate oversight.

Cashin, *et al* (2017) noted that public finance processes are typically structured around the annual budget cycle, which is meant to ensure that public expenditure is well planned, executed and accounted for. Budget execution involves the release of funds to line ministries or departments/agencies according to the approved budget and making payments for goods and services. It is during this stage that government agencies make payments to health care providers (both public and private) for covered services. Budget monitoring involves ensuring that spending agencies and entities comply with laws and regulations, implement good financial management systems with reliable financial reports and internal controls and audits, and achieve budgetary

objectives. Health authorities should engage at each step of the budget cycle to ensure alignment with sector priorities and effective and efficient use of public resources.

2.2.4 Infrastructure and Commodity Management Practices of Essential Medicines

A study was conducted in Brazil focusing on availability of essential medicines in lower level health facilities in the Brazilian Health System (Nascimento *et al*. (2017). A cross-sectional and evaluative design was used in the study. Observation scripts were used in dispensing services at the lower level health services. The study interviewed public managers, patients, and health care professionals by use of semi-structured questionnaires. The study established statistically significant differences on the different variations of infrastructure, numbers, and active pharmacists across different areas in Brazil and essential medicines availability.

For India, Prinja et al (2015) focused on whether medicines are available in government-owned health facilities of two States in Northern India. The study was done in 80 government-owned facilities across 12 districts of Punjab and Haryana. The study found out that availability of essential medicines was varied across the districts on the basis of the level of infrastructural development.

Ngugi and Mugo (2014) interrogated the institutional factors which influenced procurement of essential drugs in the government-owned facilities in Kenya. The researchers adopted a survey design where they also employed used qualitative and quantitative methods. The main focus was the ICT infrastructure, financial availability and staff capacity. Through correlation analysis, the study established that ICT

infrastructure was one of the main determinants of effective procurement of medicines in government-owned health facilities in the Country.

The public health supply chains of most African countries, too, are typically unable to respond effectively to existing demands, putting both health commodities and health outcomes at risk. They lack appropriate physical infrastructure (such as storage space), finances and technology to manage supply chain flows. Efficient public health supply chain performance is essential for ensuring access to health commodities for positive health outcomes (Meeme, *et al.,* 2015). This is particularly important in most countries in sub-Saharan Africa where large proportion of the population is served by the public and mission health sectors. The public/mission health supply chain manager dealing with storage and inventory management of health commodities play an essential role in the realization of global public health goals, for improving maternal health, reducing child mortality, and combating HIV/AIDS, malaria and other diseases, (Riungu, 2016).

An effective supply chain including inventory management and storage of health commodities can play a major role in bringing the direct cost of providing patient care down. Other important benefits proper inventory management and storage of health commodities in public sector includes ensuring availability of ED, reducing counterfeits and wastage, increasing responsiveness, resilience, choices and drug utilization. Proper inventory management also plays a major role in reducing medication errors. A robust and effective supply system would also relieve the caregivers of the duties and stress associated with concerns about medicine availability

and quality thus allowing them to focus on what they do best which is patient care, (Riungu, 2016).

In healthcare, ensuring that there are adequate drugs and supplies for every patient is paramount, as partial or intermittent treatment can lead to less-than-optimal results and in some cases, this can even be disastrous, both for the individual patient and the public large. One of the major problems of lack of uninterrupted treatment includes treatment failure and the risk of developing drug resistance (Meeme et al, 2015). This is a serious consideration in dealing with infectious diseases and in chronic ailments such as diabetes which require continuous treatment in order to keep the disease under control. Adequate drug supplies including contraceptive security contribute to improved quality of health care and satisfaction of health workers. Well-supplied health programs can provide superior service, while poorly supplied programs cannot. Likewise, well-supplied health workers can use their training and expertise fully, directly improving the quality of care for clients. Customers are not the only ones who benefit from the consistent availability of commodities. An effective logistics system helps provide adequate, appropriate supplies to health providers, increasing their professional satisfaction, motivation, and morale. Motivated staffs are more likely to deliver a higher quality of health care service (Riungu, 2016).

2.3 Theoretical Framework

This subsection presents a review of theories which anchor the study. This research was anchored on the Strategic Triangle Theory, Human Capital theory and the Theory of Total Quality Management as discussed.

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2.3.1 Human Capital Theory

One of the important theories that will undergird the study is the human capital theory, explained by Becker (1964). The author explains that human capital is a key factor in the production chain. He also explains that human capital enhances productivity in all tasks, but with a differential in different tasks, organizations, and context. The term "human capital" was first used in modern literature on human resources by Schultz (1961). In his writings, Schultz classified human capital expenditures as investment rather than consumption. Moreover, Weisbrod (1961) put forward a seminal conceptual framework for providing estimates of the value of human capital as assets (Dawson, 2012).

Šlaus and Jacobs (2011) explained the concept of human capital as a situation where humans are considered an important factor which contributes to social development and economic growth. In their theory, the researchers further averred that human capital development is a critical factor of sustainability in productivity and focus to facilitate emergence of mentally self-conscious individuals and accelerate positive change of human consciousness remains the most effective approach to ensure sustainability of society.

Effectiveness of health workers trainings such commodity management training are therefore, imperative for achievement high management of essential medicine in the health facilities. The theory is particularly germane because it explains that proper management of human capital training can directly improve commodity management practices of medicines in government-owned facilities.

2.3.2   Theory of Total Quality Management (TQM)

The theory of TQM ascertains that there is need to have continuous quality improvement and quality management at all levels of the value chain. The theory is proposed by Joseph Juran who argued that "product" in the TQM context was the output of any process focusing on goods and services (Kamra *et al*., 2016). Total quality management (TQM) is an approach that uses long-term planning to ensure customer satisfaction. TQM is mostly used to enhance processes, services, culture as well as products in an organization. Since TQM is a customer-focused organizational approach, the use of essential medicine supply to the county population can be related to the aspect of customer experience enhancing. TQM embraces eight principles to ensure there is improved service delivery, in this case, delivery of essential medical supplies.

One of the foremost principles of TQM is customer-focused approach to determine the level of quality of services and products offered. The county government can thus treat the patients and the population as customers who need high level of service (El-Tohamy & Al Raoush, 2015). The county can thus engage in practices like training healthcare workers, checking the stock levels and having appropriate budgetary allocations. TQM embraces total employee involvement where employees participate in the process to improve the common goals, in this case, ensuring adequate supply of essential medicines. There is need to integrate continuous improvement efforts in normal business or county operations. Likewise, the county government need to engage workers through all the levels of service improvement.

TQM is also a process-centred approach where process thinking is embraced taking inputs from the suppliers, and transforming them to customer satisfaction (El-Tohamy

& Al Raoush, 2015). Performance measures are required to check whether the processes are geared towards achieving the desired effects, adequate essential medicines' supply. Other TQM principles include integrated systems (sub-county health facilities operating to feed one department of health), strategic and systematic approach, and continued improvement. Fact-based decision making is also encouraged under TQM with efficient communications (Kamra *et al*., 2016). The TQM model was selected as it presents the broader influences that are able to influence the performance of the county health department in terms of providing essential services.

2.3.3   Strategic Triangle Theory

Before the Strategic Triangle Theory by Moore (1995), the Public Value Theory was present to enhance improvement of delivery of services in the government-owned facilities. The theory seeks to argue that public value creation is the single most important goal of programmes in the public sector. This is a key value proposition which ought to guide public organizations (Moore, 1995). The Public Value theory was formulated by Moore (1995) to instill in managers of public sector institutions, a sense of deeper understanding of opportunities and constraints that they may encounter in their work, and the challenge to create value for the public. The theory presents a proposition that public value should be created through the prudent use of public resources economically taking into account what communities and residents value most.

Moore (1995) formulated a strategic framework to explain the purpose and limitations of management of public sector institutions and as well as linking the goals, responsibility and operational capability. This approach, which is centred in public value seeks to focus on a managers' focus to go beyond policy implementation and

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adherence to institutional norms. The theory included leveraging on the opportunities to significantly improve people's lives. At this level, the decision maker at a strategic level must establish a nexus between the fundamentals of feasibility, value and legitimacy.

The theory can be adopted in this study to bring more understanding to how policy and institutional framework as well as budgetary allocations can affect delivery of essential medicines through effective management. The theory posits that a manager in the public sector is supposed to make key strategic decisions including coming up with effective policies, guidelines and allocation of funds to ensure that public service delivery is enhanced.

2.4 Critique of Relevant Literature

The reviewed studies differed in context, concept and methodologies which presented research gaps that necessitate this study. The study by Mezid (2014) which assessed the pharmaceutical logistics system in Health Centres of Addis Ababa, Ethiopia presented a contextual gap based on the geographical focus. The study also solely focused on staff training which presents a conceptual gap. The study by Muiruri (2017) to determine the health worker training and effective management practices of essential medicines in Meru County similarly presents a contextual gap based on the geographic location as well as conceptual gap since it focused on Health Worker Training as the main independent variable. This study also focuses on other factors other than training of health worker.

On the other hand, the study by Cohen et al (2011) interrogating the institutional frameworks available in various public sector settings of developing countries only

focused on the institutional frameworks thus presenting a conceptual knowledge gap. The study also contextually differed from this study since it focused on a number of countries. The study by Zimbulu (2013) conducted to establish the legal and institutional framework adopted a narrow conceptual focus on the institutional framework as the only factor thus presenting a conceptual research gap even though both studies share the context, Kenya. The study by Rao et al (2009) to determine the factors which are critical in ensuring there is effective management of essential medicines presented a contextual knowledge gap since it focused on US based facilities. The study by Ashigbie et al (2016) to establish the challenges of management of drugs in the private and government-owned facilities under the National Health Insurance Scheme in Ghana differed from this study in the methodological approach since it was purely a qualitative study. This study adopted a mixed methods approach in order to provide more insights on the topic.

2.5 Conceptual Framework

Jabareen (2009) argued that a conceptual framework provides in a figure form the relationship between variables. The dependent variable of this study is commodity management practices of essential medicines while the independent variables are health worker training, policy and institutional framework, healthcare budgetary allocations and infrastructure. Health worker training is measured by Professional Qualifications and Commodity Management Training; Policy and Institutional Framework is measured by county health policy and guidelines on management of essential medicines; Healthcare Budgetary Allocations is measured by amount allocated and timely disbursement; Infrastructure is measured by warehousing

infrastructure and technological infrastructure while the dependent variable is
measured by the procurement, storage and distribution practices.

Figure 2.1:

Conceptual Framework

Independent Variables   **Dependent variable**

```
┌─────────────────────────────────┐
│ Health Worker Training          │
│ • Commodity Management Training │
│ • Demand Forecasting            │────┐
│ • Needs Prioritisation          │    │
│ • Supply Chain Practices        │    │
└─────────────────────────────────┘    │
                                        │
┌─────────────────────────────────┐    │      ┌────────────────────────────────┐
│ Policy and Institutional        │    │      │ Commodity Management Practices │
│ Framework                       │    │      │ of Essential Medicines         │
│ • County health policy          │────┼───── │ • Procurement practices        │
│ • Guidelines on management of   │    │      │ • Storage practices            │
│   essential medicines           │    │      │ • Distribution practices       │
│ • Standard Operating Procedures │    │      └────────────────────────────────┘
│ • Separation of functions       │    │
└─────────────────────────────────┘    │
                                        │
┌─────────────────────────────────┐    │
│ Healthcare Budgetary Allocations│    │
│ • Funds availability            │    │
│ • Amount allocated              │────┤
│ • Timely disbursement           │    │
│ • Financing plans               │    │
└─────────────────────────────────┘    │
                                        │
┌─────────────────────────────────┐    │
│ Available Infrastructure        │    │
│ • Warehousing infrastructure    │    │
│ • Technological infrastructure  │────┘
│ • Distribution  systems         │
└─────────────────────────────────┘
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CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

Chapter three introduces the study methodology, and how the researcher conducted the survey. Research design, study variables, procedures of sampling, collection of data processes, instrument, and analysis approaches are discussed. In addition, the operational variables are also discussed. Reliability and validity of the study instruments are also discussed.

3.2 Research Design

A research design sought to guide in executing the research approach including the processes of data collection, analysis and report writing (Matthews & Kostelis, 2011). The researcher used a descriptive cross sectional design and a mixed qualitative and quantitative approaches for collecting primary data. The descriptive cross-sectional survey design was taken as it will be able to collect information from a large sample of respondents on a limited time frame. The descriptive design is best used to describe population characteristics, and opinions of people (Mugenda & Mugenda, 2009). The use of mixed design methods that is qualitative and quantitative enabled the data collected to be complemented and help answer the research question adequately, hence it is the most suitable in addressing the research questions.

3.3 Study Location

The research was conducted in public health facilities in Makueni County, located in Eastern Kenya. All the county and sub-county hospitals, the main referral hospital and selected lower-level facilities were included in the study. Makueni County has eight sub-county level hospitals and the County Referral Hospital of Makueni. The sub-

county level hospitals provided respondents, including the management staff to help in filling the questionnaires.

3.4 Target Population

Cooper & Schindler (2011) define the term population as the total number of all the elements about which the study intends to make inferences (Cooper & Schindler, 2011). All the health facilities in Makueni County constituted the population of the study. The study population comprised pharmacist, procurement officer, nurses, laboratory staff, clinical officers, and bio medics and stores clerks in each of the health facilities. The study focused on this category of the health facilities staff because they are involved in various stages of essential medicine management process. They also take responsibility in case of unavailability of the essential medicine since the directly interact with the patients' seeking services from the health facilities. Table 3.1 shows the representation of the target population.

Table 3.1:

Target Population

Level	Population of Facilities	Population of Health Workers
Level 5	1	266
Level 4	8	460
Level 3	50	726
Level 2	103	871
Total	**162**	**2323**

Source: *Makueni County Website (2019).*

3.5 Sampling Techniques

Sampling techniques is the process used in arriving at a representative sample from the study population. The study selected 30% of the health facilities basing on the Mugenda and Mugenda (2009) who argued that a sample of above 10% is an adequately representative of any population. Therefore, 50 health facilities were included in the study. The study adopted a stratified random sampling procedure to choose targeted 50 public health facilities in Makueni County from a population of 162 health facilities. A sample should be adequate with regard to capturing the desired effect and represents the entire population according to Ahmed et al (2011). This is calculated using the formula (Yamane):

$$n = \frac{N}{1 + N(e)^2}$$

Give:

    n = Sample size for population

    N = Total population

    e = Sampling error term

    Assumed CL at 95%, P= 0.5

$$n = \frac{2323}{1 + 2323(0.1)^2} = 96$$

From this, the appropriate sample size was calculated as 96 respondents. This number was expected to give representative findings were used in the analysis because the teams involved in commodity management perform very complementary roles at the facility level, facing similar challenges at the facility level. Stratified sampling

technique was employed in this study to select the sample according to various health facilities as shown in Table 3.2. However, medical superintend, pharmacists, procurement officers, nurses, laboratory workers, biomedical department staff and stores clerks in each of the health facilities were purposively targeted when selecting the sample size from each health facilities since they deal first hand with commodity management especially essential medicines in their respective facilities.

Table 3.2:

Target Population and Sample Size

Level	Population of Facilities	Sample for Health Facilities	Population of Health Workers	Sample of Health Workers
Level 5	1	1	266	11
Level 4	8	2	460	19
Level 3	50	15	726	30
Level 2	103	31	871	36
Total	**162**	**50**	**2323**	**96**

Source*: Makueni County Website (2019)*

3.5.1 Criteria for Exclusion and Inclusion

Health workers whose responsibilities included management of essential medicines at any level in the health facilities in Makueni County were included in this study. Those health workers in Makueni County who are not directly involved in commodity management of essential medicine were excluded from this study. Those selected respondents who did not give consent to participate in the study were excluded from the research.

3.6 Research Instruments

The researcher used a questionnaire to collect data for this study. The respondents filled in the questionnaire in the presence of the researcher or research assistant. The researcher used self-administered questionnaires (SAQs) to collect primary data and collected secondary data through analysis and synthesis of existing literature on availability of medicines in the devolved units in the country's health system.

3.6.1 Questionnaire

The researcher used structured questionnaires as a primary tool for data collection. According to Kothari (2004), questionnaires capture information in a structured manner. They are less costly and easy to administer compared to other methods like interview which might need expertise to ask and probe for answers. The questionnaire was structured and organized according to the key thematic areas corresponding to specific objectives of the study.

Additionally, the questionnaire had both open and closed-ended questions with a view not only to get a factual aspect of the responses but also opinion from the selected participants (Harper & Thompson, 2011). The key areas of the questionnaire in addition to the socio demographic information included supplier stock levels, health budgetary allocations, health worker training and the disease prevalence patterns. The questionnaire combined both ordinal and Likert scale to gather the necessary for various type of data processing techniques. The questionnaire further contained open ended questions that were used in collecting qualitative data.

3.7 Pre-Testing of Research Instruments

The researcher pretested the questionnaire through a pretest study in Machakos Sub-County Hospital in the neighbouring Machakos County. The pre-test was conducted on 10 health workers from Machakos Sub-County Hospital and who are involved in management of essential medicines at the facility. Pre-testing the questionnaire assisted to improve the logical flow of the questions as well as remove ambiguity and syntactical errors. Time taken to take complete one piece of questionnaire and interview was recorded to inform the planning and execution of the survey process.

3.7.1   Reliability and Validity

To ensure validity in the design of the questionnaire, inputs of the researcher's thesis supervisors were taken into consideration. The researcher also asked for input from selected professionals in the health facilities to make a decision on the completeness, ordering, and comprehensiveness of questions. The input was also useful to verify that the all the necessary information for the purpose of the study would be collected from the participants of the study (Bonett & Wright, 2015).

Ability of research instruments to yield consistent results after repeated trials is known as reliability (Mugenda & Mugenda, 2003). In achieving reliability of the questionnaires, a pretest study was carried out and any misinterpretations were corrected appropriately. Further, the study subjected the collected data into Cronbach's alpha to test whether the data collected is reliable. Data was termed as internally consistent when the Cronbach's alpha is 0.7 and above (Table 3).

Table 3.3:

Internal consistency – Cronbach's Alpha

Cronbach's Alpha	Internal Consistency
α≥0.9	.Excellent (high stakes testing)
0.7≤ α<0.9	.Good (low stake testing)
0.6 ≤α<0.7	.Acceptable
0.5 ≤α<0.6	.Poor
α<0.5	.Unacceptable

3.8 Data Collection Process

Data collection started with permission from the County Health Management Team leadership, in this case the County Chief Officer for Health and Sanitation in Makueni County. Data collection process then started with identifying the right persons to engage, then asking for their engagement, booking time with them and then executing the interview. The participants were asked to participate through asking for their informed consent upon which they were then presented with the questionnaire.

For those not able to participate directly, the questionnaire was delivered by them for self-administration. To enable easy data collection, the tools were short and easy to answer and for the interview to take the least amount of time possible to avoid fatigue in the respondents that can lead to biased information.

3.9 Analysis and Presentation of Data

The researcher analyzed the submitted questionnaires. Then, items (variables) were categorized; coded and data fed into the computer for analysis. The analysis was done with the aid of an analysis software (SPSS) version 20.0. Quantitative data yielded

from questionnaire items were reported directly in summary with inferences that were drawn from it. Data was presented and summarized by the use of bar graphs, pie charts and frequency tables. The research was expected to yield data that requires quantitative analysis. After analysis of the data, logical conclusions and recommendations were developed by the researcher.

The researcher applied Chi Square test which was the most relevant test to establish relationship between categorical variables (Mugenda & Mugenda, 2003). Chi Square test was used in this research to explain any significant relationship between selection practices, procurement practices, training support and rational use practices and availability of essential medicine. Descriptive statistics were used to help in summarizing information about the essential medical supplies. Data presentation was in form of tables, charts and frequency tables. Graphs were generated from the data collected and used to show how the variables influence supply of essential medicines. The study findings are expected to follow a binary logistic regression model as shown. The following a binary logistic regression model was used;

$$\mathbf{Y} \text{ (Effective/Ineffective)} = \boldsymbol{\beta_0} + \boldsymbol{\beta_1 X_1} + \boldsymbol{\beta_2 X_2} + \boldsymbol{\beta_3 X_3} + \boldsymbol{\beta_4 X_4} + \boldsymbol{\mu}$$

Where:

Y = Commodity Management Practice

β_0 = the Constant

β_1 = the coefficient of Xi for i = 1, 2, 3,

β_2 = the coefficient relating the independent variables when X = 0

$\qquad$ X_1 = Health Worker Training

$\qquad$ X_2 = Policies and Institutional Framework

$\qquad$ X_3 = Healthcare Budgetary Allocations

$\qquad$ X_4 = Available Infrastructure

$\qquad$ ε = error term

According to Hsieh and Shannon (2005), qualitative content analysis is defined as a method of research used in subjective interpretation of text data utilizing the systematic classification approach of coding and identifying patterns and themes. For the purpose of this analysis, the qualitative data was categorised into themes which correspond to the study objectives. The systematically organised data was subsequently interpreted within the purview of the research problem as contained in the study. .

3.10 Ethical Considerations and Approval

Ethical consideration explain how the study respects individual rights (Jwan & Ong'ondo, 2011). Ethical review, codes of ethics, and other relevant clearances were sought and obtained for purposes of protocol development, data collection and reporting. Data was only collected when approved by relevant legal authorities in Kenya, including the Kenya Methodist University (KeMU) Scientific and Ethical Review Committee (SERC), an approval letter from the department of health systems management, the National Commission for Science Technology and innovation (NACOSTI), and relevant health research boards and committees in the respective Counties targeted for the research. Participation was voluntary and consented by the participant signing the current informed consent form.

CHAPTER FOUR: RESULTS AND DISCUSSION

4.0 Introduction

In this chapter, data analyses, results, findings and finally discussion made based on the findings are presented. The chapter has the following sections: response rate; background information on those who participated in the study; descriptive analyses based on the variables measured; and, finally inferential statistics. These comprised results for chi-square analysis, univariate binary logistic and multivariate binary logistic regression analyses. The results presented in this chapter were in the form of charts and tables.

4.1 Response Rate

In this research, 96 questionnaires were administered on different respondent drawn from all the selected health facilities in Makueni County. The respondents were drawn from health facilities of all levels distributed across the county. The results presented in Figure 4.1 indicates that a response rate of 91% was realized. This high response was attributed to the method of the data collected and support received from the local health administrators through authorization of the data collection process. The study adopted drop and pick methodology which allowed the respondents adequate time to fill the questionnaires.

Figure 4.1:

Response Rate
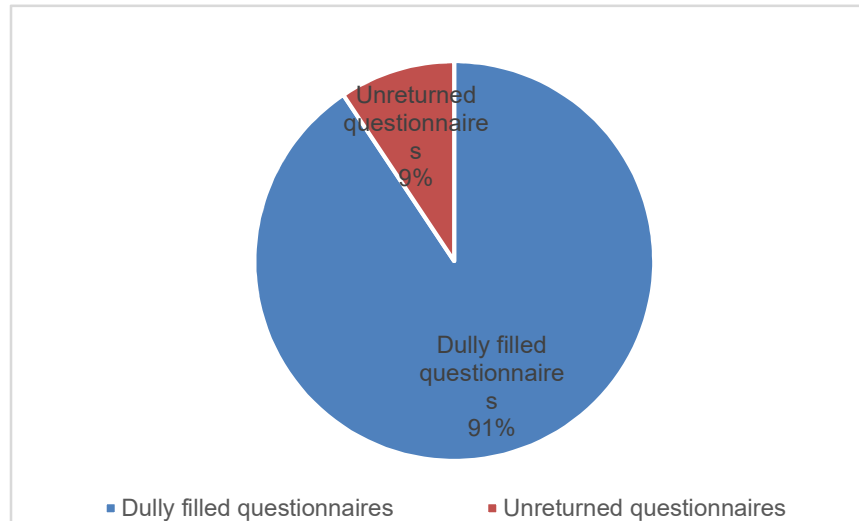
4.2 Pre-Test Study Results

A pre-test study was conducted prior to the actual survey with the aim of assessing the validity and reliability of the research instruments. The researcher conducted the pre-test with data from 10 health workers from Machakos Sub-County Hospital. Pre-testing the questionnaire assisted to remove ambiguity and syntactical errors. Time taken to take complete one piece of questionnaire and interview were taken to inform the planning and execution of the survey process.

4.2.1 Reliability Results

The findings in Table 4.1 present the Cronbach's Alpha coefficients for the variables in the study. The findings from the coefficient indicated that all the variables were determined to have Cronbach's Alpha above 0.7 which was adopted by the threshold for reliability. These results implied that the research instrument was reliable based on the arguments of Sekaran and Bougie, (2016) and Mwituria, (2012) who suggested

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that reliability of 0.7 indicated that the instruments was reliable and qualifies to be used for survey.

Table 4.1:

Summary Results of Reliability Statistics

Variables	N of Items	Cronbach's Alpha	Remarks
Health worker Training	4	0.865	Reliable
Policies and Institutional Framework	4	0.809	Reliable
Health Budgetary Allocation	4	0.731	Reliable
Available Infrastructure	4	0.875	Reliable
Commodity management Practices	3	0.764	Reliable

4.2.2 Validity Results

Research instrument validity on the other hand was considered to be qualitative and various methods were used to ensure the instrument validity. For content validity, the study ensured that all the indicators used in the questionnaires were informed by empirical and theoretical literature. This implies that the study used indicators that have been used before by other scholars which have been tested and proven. Besides, this technique, the study used test and retest methodology to test for the construct validity.

4.3 Background Information

In this section the researcher presents the respondents' background information results in terms of type of the health facility, area of specialization, their level of education and working experience. According to the results 40.2% (35) were from level 2 health facilities, 31% (27) were drawn from level 3 facilities, 17.2% (15) Level 4, while

11.5% (10) were from level 5 hospital. These finding implied that the study included health workers from all levels hence there was no bias in sampling techniques adopted.

On the area of specialization, the results show that majority of the respondents (73.6%) were nurses which was based on account that majority of the lower-level health facilities were managed by nurses who were also responsible for management of essential medicines in those facilities. However, in higher level health facilities, the study was able to sample pharmacist, procurement officer, laboratory, clinical officer, and bio medics and stores clerks as indicated in Table 4.2.

The results further indicate that majority (62.1%) of the respondents were certificate holders which were mostly nurses. Those with undergraduate degrees were 18.4% (16), 14.9% (13) indicated they were postgraduate degrees holders while 4.6% (4) were diploma holders. The results also show that respondents had varied working experience. For instance, 34.5% (30) had between 6 and 10 years of working experience, 31% (27) indicated they had between 3 and 5 years of experience, those above 10 years of experience were 25.3% (22) while 9.2% (8) indicated they had below 2 years of experience. The findings implied that sampled respondent had adequate years of working experience to understand essential medicines management practices adopted by health facilities within Makueni County in Kenya.

Table 4.2:

Background Information on the Respondents

	Category	Frequency	Percent
Type of the health facility	Level 5	10	11.5
	Level 4	15	17.2
	Level 3	27	31
	Level 2	35	40.2
	Total	**87**	**100**
Area of specialization	Pharmacist	7	8
	Procurement officer	3	3.4
	Nurse	64	73.6
	Laboratory	4	4.6
	Clinical officer	4	4.6
	Bio medics	2	2.3
	Stores clerks	3	3.4
	Total	**87**	**100**
Highest level of education	Postgraduate	13	14.9
	Undergraduate	16	18.4
	Diploma	4	4.6
	Certificate	54	62.1
	Total	**87**	**100**
Work Experience	Below 2 years	8	9.2
	3-5 years	27	31
	6- 10 years	30	34.5
	Above 10 years	22	25.3
	Total	**87**	**100**

4.3 Descriptive Analysis

In this section, the researcher presents the results of descriptive analysis conducted from the research. The purpose of the descriptive analysis was to understand the population in terms of the parameter under investigations. This section sought to find out how the participants responded to statements from the data collection instrument. In this section percentages, frequencies, standard deviation and mean were used. The section is aligned to the specific objectives in the study.

4.3.1 Health Worker Training

The study sought to establish whether health facilities in Makueni County carried out health worker training on essential medicine management practices. The results in Table 4.4 show that majority of the respondents agreed on whether their health facilities conducted trainings on essential medicine management (65.5% (57) demand forecasting 60.9% (53), needs assessment 64.4% (56) and supply chain practice 65.5% (57). However, the training did not include every stakeholder as shown by a significant proportion of the respondents who disagreed on whether they were trained on essential medicine management practices.

Health worker training is a critical strategy of ensuring effective essential medicine management practice. This finding support Kimathi, (2017) that suggested the health care sector in almost all counties are dogged by monumental challenges which range from gaps in capacity and deficiency in human resource. Training of health workers is therefore critical in addressing the human resources deficiency especially in the area of essential medicine management practices.

Table 4.3:

Essential Medicine Management Practices Trainings

	No	Yes	Total
Have you undergone essential medicine management training	34.5% (30)	65.5% (57)	87
Have you undergone essential medicine demand forecasting	39.1% (34)	60.9% (53)	87
Have you undergone essential medicine needs assessment	35.6% (31)	64.4% (56)	87
Have you undergone essential medicine supply chain practice	34.5% (30)	65.5% (57)	87

For those who indicated that they were trained on various aspects of essential medicine management practices, the study sought to establish the frequency of training. The respondents were asked to indicate how often they were trained on various aspects of essential medicine management practices. The results show that 44.8% indicated not to have attended training organized by the county, 20.7% indicated rarely, 19.5% indicated annually while those who indicated semiannually, quarterly and regularly were 4.6%, 4.6% and 5.7% respectively.

The findings implied that majority of the health workers in Makueni County were not regularly trained on essential medicine management practices. Majority relied on information obtained in medical schools or acquired elsewhere. Healthcare sector in recent past has experience many challenges including increase in demand for health services which requires modern methods and practices of managing essential medicine.

Mezid (2014) also agreed that the competence of the health workers in commodity management as well as the mode and time of financing was important in ensuring that the non-program drugs were well managed. It was presented that limited capacity contributed for the stock outs. Muiruri (2017) in Meru County reported that commodity trainings had been conducted to enhance the management of essential medicines.

Figure 4.2:

Frequency of Essential Medicine Management Practices Trainings
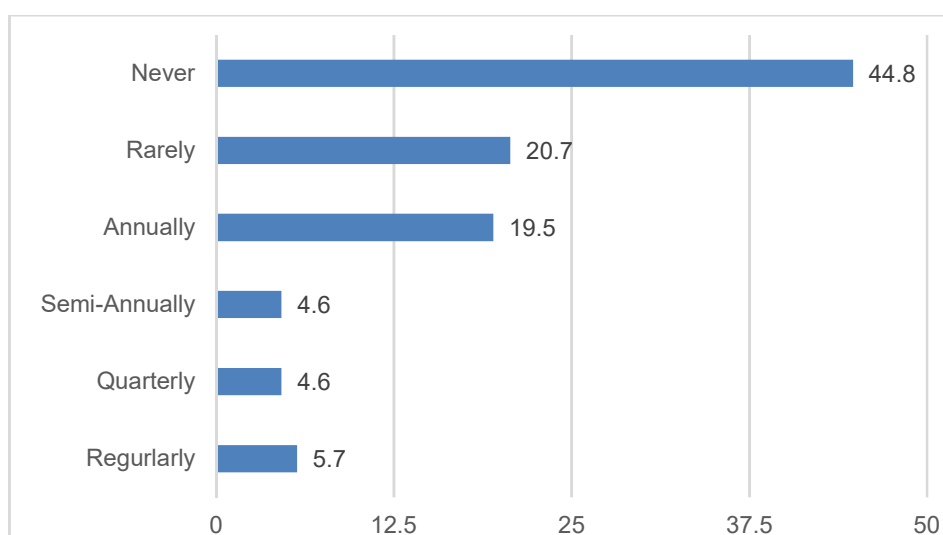
The results in Figure 4.3 show that 90% (78) reflected the need for essential medicine management practices trainings which corroborate with the findings of Mezid (2014) that the competence of the health workers in commodity management as well as the mode and time of financing was important in ensuring that the non-program drugs were well managed.

Figure 4.3:

Essential Medicine Management Practices Trainings Need Requirement
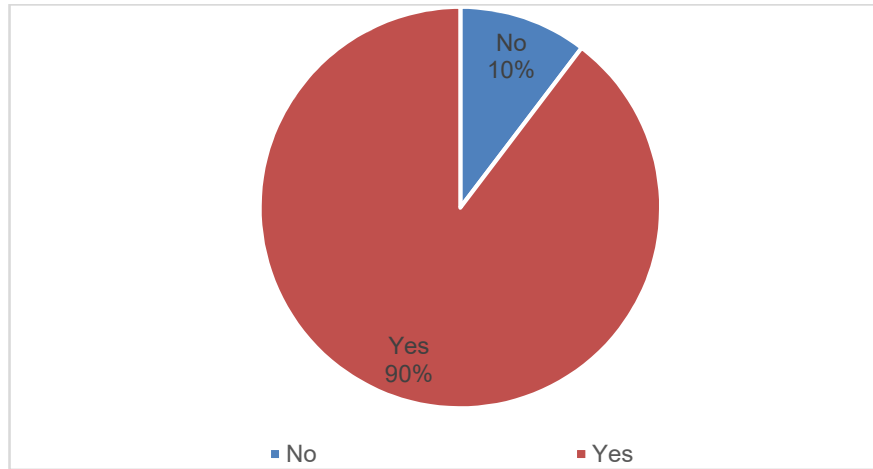
The results presented in Table 4.4 show that respondents agreed that awareness of the essential medicine management cycle by health workers in Makueni County was unsatisfactory as indicated by the mean score of 2.74. Similarly, commodity management skills, essential medicines need assessment skills and essential medicines supply chain skills was low among majority of the health workers in serving in health facilities in Makueni County as shown by the mean score of 2.75, 2.67 and 2.76 respectively.

The study further asked the respondents to comments on the level of health worker training on commodity management practices in the county. Majority of the respondent mentioned that the level of training was not satisfactory. One of the nurses mentioned that;

"Some of the medicines and other essential commodity we received require specialized management, in terms of storage and general handling, however, we have not been trained properly and we have to go out of the way to train ourselves. It will be of great

benefits of the department of health had put in place measures to ensure periodic training of health workers in modern commodity management practices"

According to Šlaus and Jacobs (2011) effectiveness of health workers' trainings such commodity management training are therefore, imperative for achievement high management of essential edicine in the health facilities. These finding agrees with Kimathi, (2017) who also found that the health sector in almost all counties is currently bedeviled by major challenges mainly from gaps in capacity, and deficiency in human resource, lack of critical institutional and legal infrastructure, runaway corruption and a conflictual relationship between the county and national governments.

Table 4.4:

Descriptive Results on Health Worker Training

	Very Unsatisfactory	Unsatisfactory	Moderate	Satisfactory	Very satisfactory	Mean	Std Dev
Awareness of the essential medicine management cycle	26.4% (23)	18.4% (16)	26.4% (23)	12.6% (14)	16.1% (14)	2.74	1.40
Commodity management skills	21.8% (19)	28.7% (25)	20.7% (18)	10.3% (9)	18.4% (16)	2.75	1.40
Essential medicines Needs assessment skills	26.4% (23)	25.3% (22)	19.5% (17)	12.6% (11)	16.1% (14)	2.67	1.41
Essential medicines supply chain	23% (20)	19.5% (17)	28.7% (25)	16.1% (14)	12.6% (11)	2.76	1.32

4.3.2 Policies and Institutional Framework

This section presents the results of descriptive analysis that sought to find out whether the county had adequate policies and institutional framework to facilitate essential medicine management practices. The respondents were asked whether County of

Makueni have necessary supporting policies to enhance essential management practices adopted by health facilities. The results show that slightly more than half (57%) indicated yes while 22% and 21% indicated not sure and disagreed respectively. The findings implied that as simple majority were satisfied with the existing policies and institutional framework available at the county enhance essential management practices adopted by health facilities.

Figure 4.4:

Adequency of the necessary supporting policies to enhance essential management practices
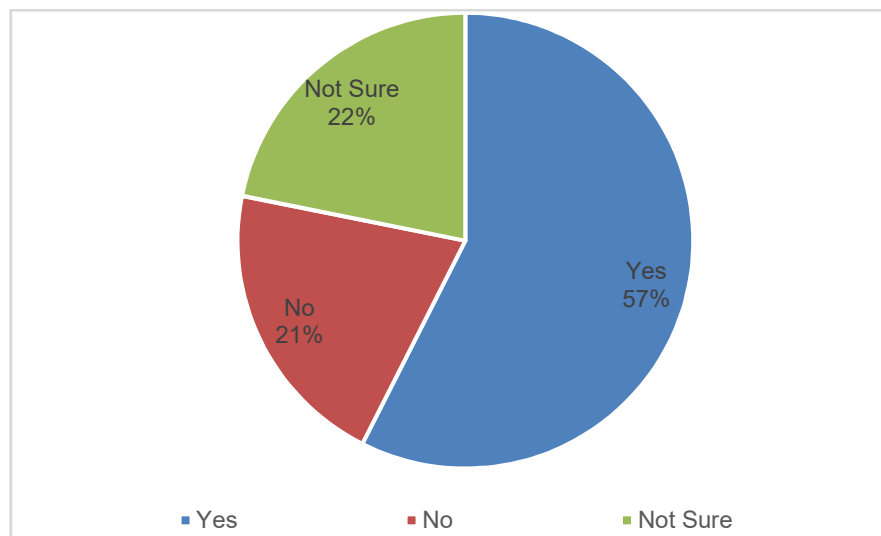
The results in Table 4.5 show that more than half (57.4%) of the respondents indicated that county helth policy was adequate and very adequate. The results further that 10.3% (9) inidcated that the county health policy was moderately adequate while 19.5% (17) and 12.6% (11) indicated iadequate and very inadequate respectively. Similarly, the respondents were of varying views on the adequacy of guidelines on

management of essential medicines, standard operating procedures and separation of functions. The findings implied that policies and insitutional framework had not been insitutionalized in all the health facilities in Makueni County. Health workers in some health facilities did not feel the impact of policies and institutional framework in place which may likely impact on their essential medicine management practices.

These findings support Cohen et al (2011) who determined that the main factors which are critical for effective procurement of essential reproductive health supplies are: policy and regulatory environment; institutional infrastructure; financing; government leadership; and transparency. Similarly, Kimathi (2017) findings indicated that the counties face challenges in gaps in capacity, deficiency in human resource, lack of critical institutional and legal infrastructure, widespread graft and a conflictual relationship between the county and national governments.

Table 4.5:

Descriptive Results on Policies and Institutional Framework

	Very Inadequate	Inadequate	Moderate	Adequate	Very Adequate	Mean	Std Dev
County health policy	12.6% (11)	19.5% (17)	10.3% (9)	33.3% (29)	24.1% (21)	3.37	1.37
Guidelines on management of essential medicines	12.6% (11)	12.6% (11)	17.2% (15)	27.6% (24)	29.9% (26)	3.49	1.37
Standard Operating Procedures	17.2% (15)	11.5% (10)	9.2% (8)	29.9% (26)	32.2% (28)	3.48	1.48
Separation of functions	18.4% (16)	5.7% (5)	14.9% (13)	31% (27)	29.9% (26)	3.48	1.45

Finally, the respondents were asked rate policy and institutional framework for commodity management practices of essential medicines in Makueni County. The results show that majority of the respondents as indicated by 39.1% who indicated large extent and another 39.1% who indicated very large extent agreed that policy and institutional framework affects the commodity management practices of essential medicines adopted by health facilities.

The interviewed respondents also corroborated these findings by agreeing that some of the health personnel responsible for commodity management are not included in the policies making process yet policy is critical in developing standard required to essential medicine management. The respondents further mentioned that the county had put in places some of the policies which increased health worker trainings, procuring and warehousing of essential medicines and capacity building of the health workers which significantly improve the management of essential medicines.

One of the interviewees noted that;

"I am not able to respond to the questions in regards to whether the policies and legal framework is adequate for commodity management since, we are normally not fully included in policy making process, therefore majority of the personnel responsible for essential medicine management are not conversant with existing and required policies for commodity management"

These findings support Cohen et al (2011) who determined that the main factors which are critical for effective procurement of essential reproductive health supplies are the: policy, and regulatory environment;   institutional infrastructure; financing;

government leadership; and, transparency. Similarly, Kimathi (2017) indicated that lack of critical legal and institutional infrastructure affects essential medicine management practices in county government in Kenya.

Figure 4.5:

Availability of policy and institutional framework for commodity management practices of essential medicines
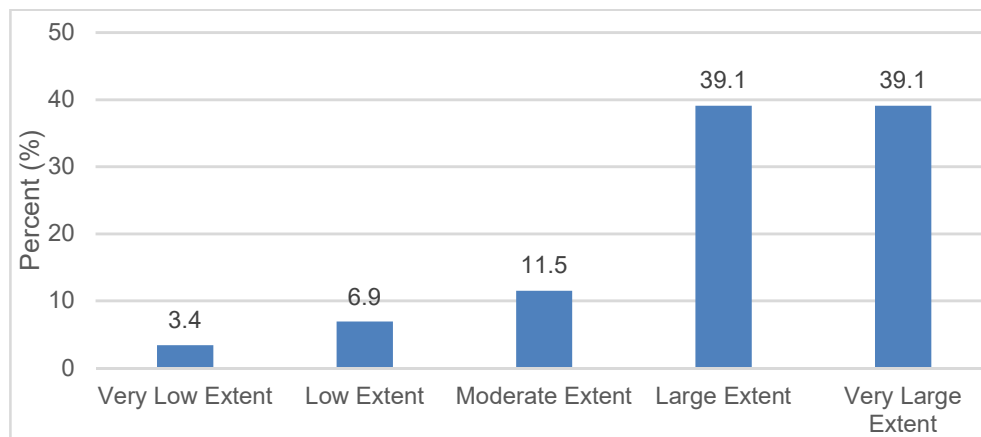
4.3.3 Healthcare Budgetary Allocations

The study further sought to determine whether health budgetary allocations affected essential medicine management practices in Makueni County. First, the respondents' views on whether the budget allocation for health facility to cater for essential medicine management activities was adequate was sought. The results in figure 4.6 indicated that slightly below average agreed (47%, 41), while 30% and 23% indicated not sure and disagreed respectively. These findings implied that some health workers were not aware of the budgeting process as indicated by those in nit sure category, a significant proportion of the workers in various health facilities were of the views that budget allocated to cater for essential medicine management activities was adequate.

Figure 4.6:

Whether health facility get enough budget allocation to cater for essential medicine management activities.
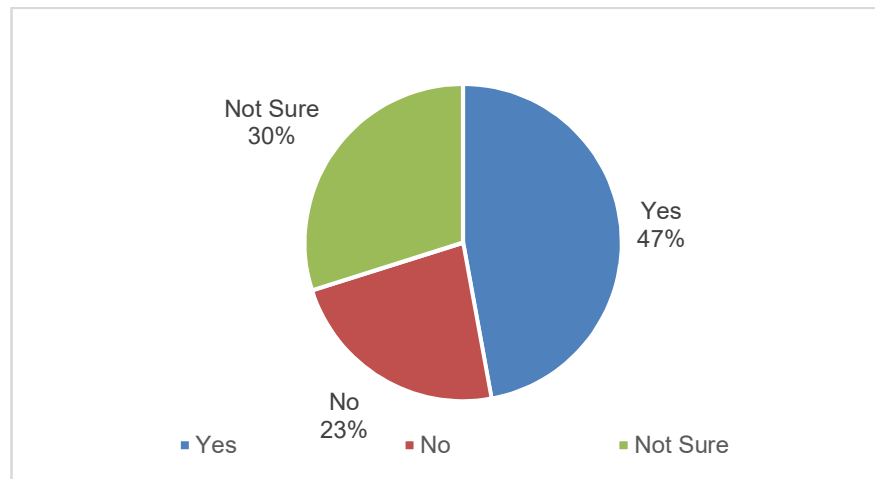
The results presented in Table 4.6 indicated that majority as shown by mean scores of above 4 agreed that funds availability, amount allocated, timely disbursement and financial planning for health facilities essential medicine management was sufficient. The finding implied that Makueni County sufficiently allocated resources for essential medicine management.

Table 4.6:

Descriptive Results on Healthcare Budgetary Allocations

	Very Insufficient	Insufficient	Moderate	Sufficient	Very Sufficient	Mean	Std Dev
Funds availability	8% (7)	9.2% (8)	1.1% (1)	36.8% (32)	44.8% (39)	4.01	1.25
Amount allocated	3.4% (3)	5.7% (5)	2.3% (2)	44.8% (39)	43.7% (38)	4.20	0.99
Timely disbursement	5.7% (5)	5.7% (5)	2.3% (2)	44.8% (39)	41.4% (36)	4.10	1.09
Financing planning	5.7% (5)	4.6% (4)	2.3% (2)	41.4% (36)	46% (40)	4.17	1.08

On the extent to which health care budget allocation affected commodity management practices of essential medicines, 47.1% indicated large extent while 44.8% indicated very large extent. Similarly, majority of the respondents further noted that the commodity management practices adopted must be in line with the budgetary allocated. They further noted that health facilities cannot procure expensive equipment yet there no adequate budget. One of the interviewees mentioned that;

"The commodity management practices adopted by health facilities are only as good as the budget allocated. Therefore, when enough resources are allocated, then health worker trainings, modern equipment and appropriate infrastructure can be put in place"

This study finding supported the finding of Rao et al (2009) who cited technical capacity, financing and institutional infrastructure as the key elements of an effective system to manage essential medicines in developing countries.

Similarly, Ashigbie et al (2016) findings from the interviews indicated that some of the concerns major from health facilities were mostly delays in NHIS reimbursements after services were offered, and low rates of reimbursements especially for medicines and this has tended to result in service providers demanding that patients pay from the pocket. The findings concurred with those of Magak and Muturi (2016) that showed that 49.1% variation in the availability of essential medicines can be directly attributed to: supply chain design; ICT; financing; staff qualifications; and, mechanism for monitoring and oversight.

Figure 4.7:

Extent to which Healthcare Budgetary Allocations affect the commodity management practices of essential medicines
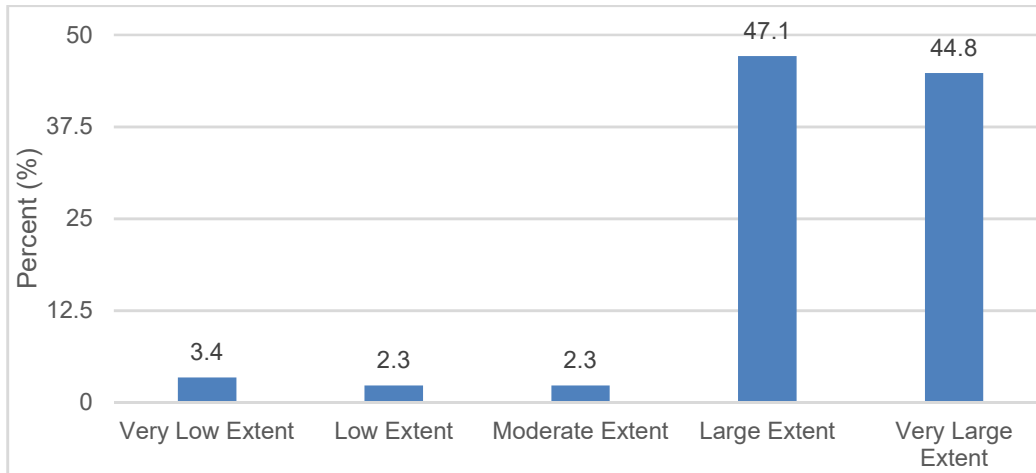
4.3.4 Available Infrastructure

The final specific objective of the research was to assess available infrastructure and how they affected the management of essential medicine among health facilities in Makueni County. The study sought to find out whether the health facilities had procurement structures, storage structures and distribution channels. The results indicate that majority of the health facilities had adequate infrastructure for essential medicine management as indicated by mean score of above 4 implying that the respondents agreed.

Table 4.7:

Available Infrastructure for Essential Medicines Management

	Very Inadequate	Inadequate	Moderate	Adequate	Very Adequate	Mean	Std Dev
Procurement structures	5.7% (5)	2.3% (2)	2.3% (2)	48.3% (42)	41.4% (36)	4.17	1.01
Storage structures and facilities	3.4% (3)	4.6% (3)	4.6% (4)	46% (40)	41.4% (36)	4.17	0.97
Distribution channels	3.4% (3)	0% (0)	4.6% (4)	50.6% (44)	41.4% (36)	4.26	0.84

The study further sought to establish whether the health facilities had modern warehousing facilities for storage of essential drugs. The results indicated that 39.1% (34) and 47.1% (38) indicated to large extent and very large extent respectively. On whether health facility had adopted latest ICT systems in management of essential medicines, the results show that majority agreed as indicated by the mean of 4.18.

Similarly, majority agreed that their facility had up to date essential medicines distribution systems and that all the essential drugs are stored as recommended by manufacturers. The finding further confirmed that availability of the necessary infrastructure for essential medicine management in majority of the health facilities in Makueni County, Kenya. Ngugi and Mugo (2014) also noted that ICT infrastructure was one of the main determinants of effective procurement of essential medicines within the government-owned healthcare facilities.

Table 4.8:

Descriptive Results on Available Infrastructure

	Very Low Extent	Low Extent	Moderate Extent	Large Extent	Very Large Extent	Mean	Std Dev
Our facility has modern warehousing facilities for storage of essential drugs	1.1% (1)	9.2% (8)	3.4% (3)	39.1% (34)	47.1% (38)	4.22	0.97
Our health facility has adopted latest ICT systems in management of essential medicines	3.4% (3)	3.4% (3)	4.6% (4)	48.3% (42)	40.2% (35)	4.18	0.93
The facility has up to date essential medicines distribution systems	2.3% (2)	8% (7)	4.6% (4)	36.8% (32)	48.3% (42)	4.21	1.01
All the essential drugs are stored as recommended by manufacturers	4.6% (4)	4.6% (4)	3.4% (3)	43.7% (48)	43.7% (38)	4.17	1.03

The researcher asked the respondents to show the extent of available infrastructure affecting the commodity management practices of essential medicines. According to the results in Figure 4.8, 37.9% indicated to a large extent while 48.3% indicated to a very large extent. The findings implied that majority of the those who responded agreed that available infrastructure was critical to commodity management practices of essential medicines in health facilities.

The interviewed personnel also agreed that availability of the infrastructure is key to commodity management practices by health facilities. They noted that for some essential medicines, modern and well-equipped cold rooms are a must otherwise most of the such medicine can easily get spoiled. One of the interviewees noted that;

"In the modern health facilities, it critical to have modern infrastructure in place, essential medicines such as vaccines for new baby, are highly sensitive and requires

the correct conditions for storage. Therefore, availability of infrastructure in health facilities is central in commodity management practices used within these facilities"

The finding supported those of Prinja et al (2015) in India, who focused on the extent to which medicines in government-owned facilities of two Indian States in the North and established that there was varied availability when it comes to essential medicines across the districts based on the infrastructural development.

Figure 4.8:

Extent to which Available Infrastructure affect the commodity management practices of essential medicines
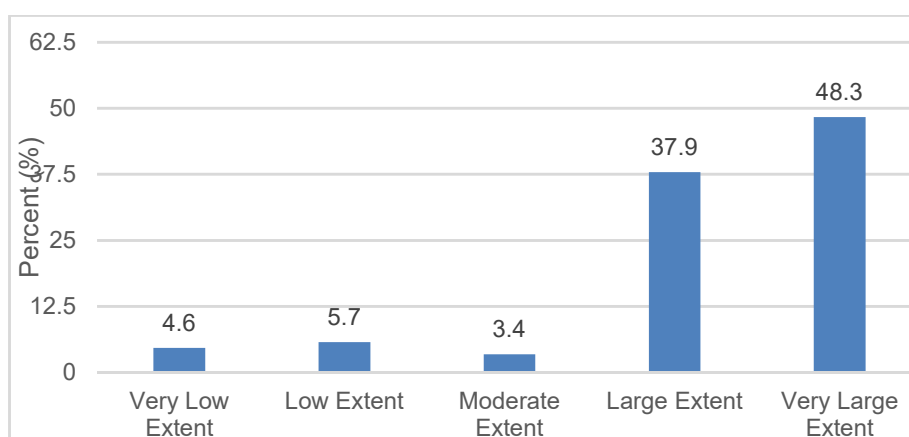
4.3.5 Commodity Management Practices of Essential Medicines

The researcher assessed the effectiveness of the commodity management practices of essential medicine in Makueni County, Kenya. The researcher asked those who responded to provide their views on whether management of essential medicine was effective in their health facilities. The results show that 74% (64) indicated that management of essential medicine in their facilities was effective while 26% (23) indicated ineffective. The findings demonstrated that a vast majority of the healthcare facilities in Makueni County had effective essential medicine management practices.

Figure 4.9:

Effectiveness of essential medicine practices adopted by health facilities in Makueni County
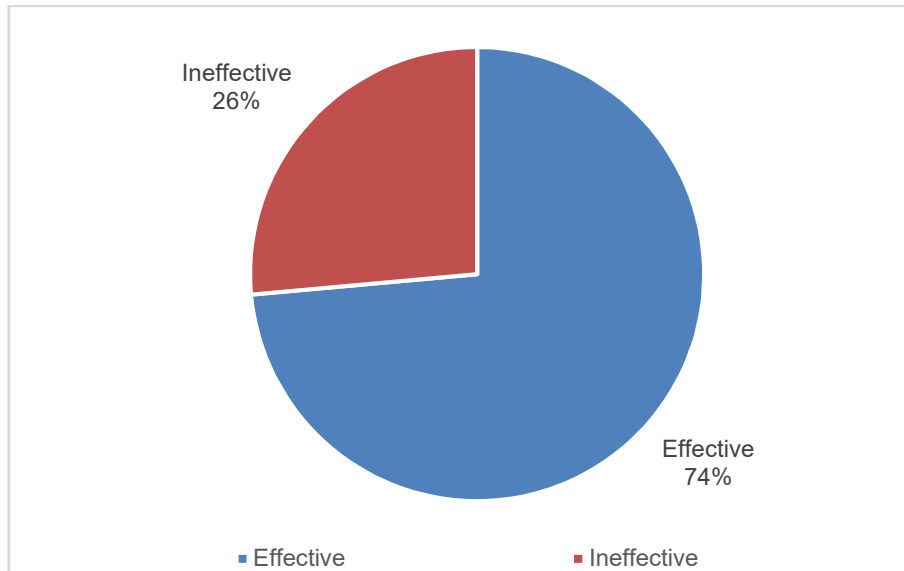
Figure 4.10 show that 76% (66) disagreed that they sometime experienced stock outs in their hospitals while 24% agreed. These finding are further an indication of the effectiveness of essential medicine management practices. Makueni County was among the selected Counties that piloted the universal health coverage (UHC) which explain why they adopted effective essential medicine management practices and experienced less stock out of the essential medicines. Okech, and Lelegwe, (2016) noted that the roll out of UHC ensured that that all people can use the curative, preventive, promotive, palliative and rehabilitative health services they need in adequate quality to be effective, but at the same time ensuring that people utilizing these services are not exposed to financial hardship. This concern has continued to dominate in health care debates across many regions.

Figure 4.10:

Whether there Incidences of Stock Outs Of Essential Medicines
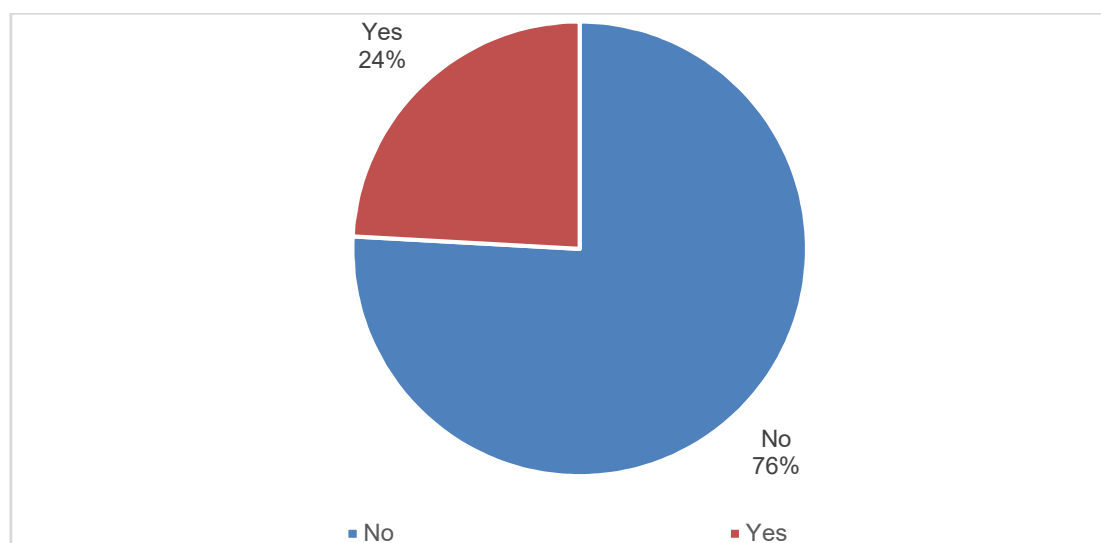
Table 4.9 also shows that majority of those who responded were positive on the essential medicines' procurement practices, storage practices and distribution practices adopted in their health facilities which implied that essential medicine management in Makueni County was effective.

Table 4.9:

Adequacy of Commodity Management Practices of Essential Medicines

	Very Inadequate	Inadequate	Moderate	Adequate	Very Adequate	Mean	Std Dev
Essential medicines Procurement practices	5.7% (5)	2.3% (2)	3.4% (3)	39.1% (34)	49.4% (43)	4.24	1.05
Storage practices	3.4% (3)	2.3% (2)	8% (7)	44.8% (39)	41.4% (36)	4.18	0.93
Distribution practices	6.9% (6)	5.7% (5)	2.3% (2)	40.2% (35)	44.8% (39)	4.10	1.15

Majority of the respondents interviewed noted that counties Makueni County included were at the initial stages operationalization of devolved health services which imply that essential medicines management practices were still taking shape. One of the respondents mentioned that "Since the counties are still putting in place structures, the management of essential medicines may not be at the levels required but necessary actions are being taken to improves the way counties health workers procure, store, manage essential medicines in county health facilities"

4.4 Inferential Statistics

The inferential statistics were conducted to test the significant determinants of commodity management practices of essential medicines within government-owned healthcare facilities in the County. The research utilized chi-square measures of association and binary logistics regression to tests the effect of health workers training, policy and institutional framework, healthcare budgetary allocations and available infrastructure.

4.4.1 Chi-Square Measures of Association

The chi-square analysis results are presented in Table 4.10. The results show that health worker training and essential medicine management practices had a chi square $\chi^2=12.607$, p=0.001. These results indicate that there existed a positive and significant association between health worker training and essential medicine management practices. The finding implied that increase in health worker training would results to better management practices of essential medicines in healthcare facilities. Muiruri (2017) in Meru County reported that commodity trainings had been conducted to enhance the management of essential medicines. This also had a positive influence on Management of Essential Medicines.

The results further show that policy and institutional framework and essential medicine management practices had a chi square $\chi2=1.729$, $p=0.189$. Implying the association between policy and institutional framework and essential medicine management practices was not significant. These findings do not support Cohen et al (2011) who determined that the main factors which are critical for effective procurement of essential reproductive health supplies are: government leadership; the policy, and regulatory environment; financing, institutional infrastructure; and transparency. However, majority of respondent in this study were apprehensive on the policy and institutional since they were not involved in the formulation and implementation of the policies and institutional frameworks.

The results also indicated the healthcare budgetary allocation and essential medicine management had a significant association ($\chi2=46.428$, $p=0.0.000$). These implied that increasing budgetary allocation for health care would definitely improve the management practices of essential medicine within health facilities in Makueni County, Kenya. Similarly, Ashigbie et al (2016) findings from the interviews indicated that some of the major concerns in facilities were the especially delays in NHIS reimbursements, and low rates of reimbursement for medicines which result in providers asking patients to pay supplementary fees. The findings concurred with those of Magak and Muturi (2016) that showed that 49.1% changes in the availability of essential medicines can be attributed to: staff qualifications; supply chain design, ICT, financing and mechanism for oversight and monitoring.

Finally, the results of chi-square analysis indicate that available infrastructure had positive and significant association with management practices of essential medicine

within health facilities ($\chi2$=47.945, p=0.0.000). The finding implied that health facilities with better infrastructure adopted better practices in their management of essential medicines. Ngugi and Mugo (2014) also noted that ICT infrastructure was one of the main determinants of effective procurement of essential medicines in Kenya public health facilities. The finding supported those of Prinja et al (2015) in India, who focused on the availability of medicines in public sector health facilities of two North Indian States and established that there was varied availability of essential medicines across the districts based on the infrastructural development.

Table 4.10:

Results for Chi-Square Measures of Association

Variable	N	Chi-Square ($\chi2$)	df	P-value
Health Worker Training	87	12.607	1	0.001
Policy and Institutional Framework	87	1.729	1	0.189
Healthcare Budgetary Allocations	87	46.428	1	0.000
Available Infrastructure	87	47.945	1	0.000

Dependent Variable: Essential Medicines Management Practices

4.4.2 Binary Logistic Regression Analysis

Further, to test whether health worker training, policy and institutional framework, healthcare budgetary allocation and available infrastructure predicted the management practices of essential medicines, this study adopted a binary logistics model. The study sought to determine the likelihood that the above variables could improve management practices of essential medicine in health facilities in Makueni County.

The results in Table 4.11 show that health workers with satisfactory training were 0.59 (Odds Ratio=0.59) more likely to be effective in essential medicines management. The

finding implied that training of health workers led to adoption of better management practices of essential medicines in health. The findings were also reported by Muiruri (2017) in Meru County that reported that commodity trainings had been conducted to enhance the management of essential medicines.

The results further show that adoption effective policy and institutional framework was 0.526 more likely to improve the effectiveness of essential medicine s management practices in health facilities than having ineffective policy and institutional framework. The finding implied that effective policy and institutional structures enhanced management of essential medicines. The policies and proper structures lead to adoption of quality standard in handling of essential medicines in health facilities. These findings support Cohen et al (2011) who determined that the main factors which are critical for effective procurement of essential reproductive health supplies are: the policy, and regulatory environment; government leadership; government leadership; the institutional infrastructure; financing; and transparency. Similarly, Kimathi (2017) findings indicated that the counties face challenges ranging from: lack of critical policy and institutional infrastructure; sever shortages in human resource; capacity deficiency; endemic corruption and an adversarial relationship with the national government.

The results also show that having sufficient budgetary allocation was 8.684 more likely to improve the management of essential medicines in health facilities as compared to having insufficient budgetary allocations. These implied that management of essential medicines required financial resources in terms of procuring, storage and distribution. The findings concurred with those of Magak and Muturi (2016) that indicated that over

49% variation on essential medicines availability could directly be attributed to staff qualifications, information, Communications Technology (ICT), financing, supply chain design, and oversight and monitoring mechanism.

Finally, the results of univariate binary logistics analysis indicated that health facilities with adequate available infrastructure were 2.336 more likely to adopt effective essential medicine management practices compared to those with inadequate infrastructure. The finding implied that availability of infrastructure improved the management practices of essential medicine in health facilities in Makueni County. The findings concur with those of Ngugi and Mugo (2014) who also noted that ICT infrastructure was one of the main determinants of effective procurement of essential medicines in Kenya public health facilities.

Table 4.11:

Binary Logistic Regression Analysis

Variable	B	S.E	Odds Ratio	P Value	Nagelkerke R Square
Health Worker Training					
Unsatisfactory (ref)			1		
satisfactory	0.528	0.263	0.59	0.045	0.283
Policy and Institutional Framework					
Ineffective (ref)			1		
Effective	0.642	0.492	0.526	0.041	0.599
Healthcare Budgetary Allocations					
Not Sufficient (ref)			1		
Sufficient	2.162	1.1	8.684	0.049	0.627
Available Infrastructure					
Inadequate (ref)			1		
Adequate	0.129	1.208	2.336	0.015	0.391

Significance P<0.05   **Sample size= 87**

66

4.4.3 Multivariate Binary Logistic Regression Analysis

The study finally conducted a multivariate regression analysis to test the most significant determinants of essential medicines management practices among the health facilities in Makueni County, Kenya.

Table 4.12:

Results for Multivariate Binary Logistic Regression Analysis

Model Summary			
Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	49.831a	0.507	0.774

a Estimation terminated at iteration number 8 because parameter estimates changed by less than .001.

The results of the model summary revealed Nagelkerke R Square =0.774 which implied that all the independent variables (health worker training, policy and institutional framework, healthcare budgetary allocations and available infrastructure) accounted for 77.4% of the variation in essential medicines management practices. The finding implied that these variables have high explanatory power on the essential medicines management practices.

Table 4.13: Results for Multivariate Binary Logistics Regression Analysis

	B	S.E.	Wald	df	Sig.	Exp(B)
Health Worker Training	1.374	0.819	2.816	1	0.093	3.95
Policy and Institutional Framework	3.232	0.909	12.654	1	0.000	25.325
Healthcare Budgetary Allocations	2.185	0.822	7.067	1	0.008	8.892
Available Infrastructure	5.296	0.887	35.659	1	0.000	0.728
Constant	5.486	0.898	37.292	1	0.000	0.004

Significance P<0.05   **Sample size= 87**

The results of multivariate binary logistics analysis in Table 4.12 show that health workers with satisfactory training were 3.95 (Odds Ratio=3.95) more likely to be effective in essential medicines management. The finding implied that training of health workers led to adoption of better management practices of essential medicines in health. This study finding agreed with those of Muiruri (2017) who found that commodity trainings had been conducted to enhance the management of essential medicines. This also had a positive influence on essential medicines management. The study finding further concurred with a study by Lubinga et al (2014) that analysed the impact of training of pharmacy workers and deployment on access to essential medicines. The study reported that innovative human resources intervention improved medicines supply chain in a low-income country. The study findings further agreed with those of Olaniran et al (2021) that analysed essential medicines stock-outs among Community Health Workers (CHWs) in low and middle income countries. The study found that lack of proper training by health worker in commodity management was the among the challenges that resulted in stock-outs of essential medicines.

Adoption effective policy and institutional framework was 25.325 more likely to improve the effectiveness of essential medicines management practices in health facilities than having ineffective policy and institutional framework. The study further established that policy and institution a framework had a significant effect on effectiveness of essential medicines management practices. The study findings agreed with Zimbulu (2013) who conducted a study to establish the legal and institutional framework for effective management practices of essential medicines in Kenya and established that among other factors, the institutional framework regarding guiding policies, Financing and procurement were significant factors in having effective management practices of essential medicines in Kenya. Similarly, Kimathi (2017) findings indicated that the counties face challenges ranging from: endemic corruption, capacity deficiencies, lack of critical legal and institutional infrastructure, human resource shortages, and adversarial relationship with the national government. The net effect of these challenges is the stagnation of healthcare and even a reversal of some gains according to health indicators.

The results also show that having sufficient budgetary allocation was 8.892 more likely to improve the management of essential medicines in health facilities as compared to having insufficient budgetary allocations. The regression results also revealed that budgetary allocation significantly predicted the effectiveness of essential medicine management practices in health facilities in Makueni. The finding of this study concurred with those of Rao et al (2009) whose study also investigated a range of available financing mechanisms for the same and other options to support the management of essential medicines. Through rigorous inferential interrogations, the paper cited technical capacity, financing and institutional infrastructure as the key

elements of an effective system to manage essential medicines in developing countries. Ashigbie et al (2016) also conducted a research to establish the challenges of management of medicines in public and private sector under National Health Insurance Scheme of Ghana using a qualitative study and the findings from the interviews indicated that some of the common concerns in health facilities were the delays in the release of reimbursements from NHIS, and low rates of reimbursements for medicines which caused the patients to be requested to pay supplementary fees.

Finally results of multivariate binary logistics analysis indicated that health facilities with adequate available infrastructure were 0.728 more likely to adopt effective essential medicine management practices compared to those with inadequate infrastructure. These findings support Cohen et al (2011) on critical factors for effective procurement of essential reproductive health supplies are: policy, and regulatory environment; institutional infrastructure; financing; government leadership; and transparency. However, majority of respondent in this study were apprehensive on the policy and institutional since they were not involved in the formulation and implementation of the policies and institutional frameworks. Prinja et al (2015) also focused on the medicine availability in publicly owned health facilities of two states in Northern India. The study was carried out in 80 public health facilities in 12 districts in Punjab and Haryana. It was established that there was varied availability of essential medicines across the districts based on the infrastructural development.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

In this chapter, the study summarizes the findings based on the specific objectives, provide the conclusion and recommendation made. The recommendation made include recommendations for practice improvement and policy formulation. The study also suggests areas for further research in this chapter.

5.2 Summary of Findings

The study was based on four specific objectives which included to determine the effect of health worker training, policy and institutional framework, healthcare budgetary allocation and available infrastructure on essential medicines management practices in Makueni County. This section presents the summary based on these specific objectives.

5.2.1 Health Workers Training and Essential Medicines Management Practices

The study results established that majority of the health workers in Makueni County were not regularly trained on essential medicine management practices. Majority of them relied on information obtained in professional training despite the fact that healthcare sector in recent past has experience many challenges including increase in demand for health services which requires modern methods and practices of managing essential medicine. The findings of inferential statistics established that health worker training had a significant and positive effect on management practices of essential medicine in Makueni County, Kenya. The findings implied that increase in health workers training was more likely to improve management practices of the essential medicine in health facilities in Makueni.

5.2.2 Policy and Institutional Framework and Essential Medicines Management Practices

The second study objective was to determine the effect of policies and institutional framework on essential medicine management practices in Makueni County. The findings implied that as simple majority were satisfied with the existing policies and institutional framework available at the county enhance essential management practices adopted by health facilities. The findings further show that adoption effective policy and institutional framework more likely to improve the effectiveness of essential medicine s management practices in health facilities than having ineffective policy and institutional framework. The finding implied that effective policy and institutional structures enhanced management of essential medicines. The policies and proper structures lead to adoption of quality standard in handling of essential medicines in health facilities.

5.2.3 Healthcare Budgetary Allocations and Essential Medicines Management Practices

The study further sought to determine whether health budgetary allocations affected essential medicine management practices in Makueni County. The findings established that some health workers were not aware of the budgeting process as indicated by those in nit sure category, a significant proportion of the workers in various health facilities were of the views that budget allocated to cater for essential medicine management activities was adequate. The findings also show that having sufficient budgetary allocation was more likely to improve the management of essential medicines in health facilities as compared to having insufficient budgetary

allocations. These implied that management of essential medicines required financial resources in terms of procuring, storage and distribution.

5.2.4 Available Infrastructure and Essential Medicines Management Practices

The final specific objective of the study was to assess available infrastructure and how they affected the management of essential medicine among health facilities in Makueni County. The results indicate that majority of the health facilities had adequate infrastructure for essential medicine management as indicated majority of the respondents who agreed. The results of binary logistics analysis indicated that health facilities with adequate available infrastructure were more likely to adopt effective essential medicine management practices compared to those with inadequate infrastructure. The finding implied that availability of infrastructure improved the management practices of essential medicine in health facilities in Makueni County.

5.3 Conclusion

The study concluded that healthcare sector is a dynamic sector that faces different on a daily basis. Therefore, health worker training is critical since to enables the healthcare professional to share knowledge on new ways of managing essential medicines to enables other professional to adopt better practices. Therefore, the study concludes that continuous trainings is significant in ensuring provision of best quality health care services.

The study further concludes that a healthcare system cannot operate effectively devoid of standard rules, policies and proper institutional structures. Therefore, health systems that adopts proper policy and institutional framework provides the necessary basis for effective management practices in health facilities. Standardization of rules, policies

and structures ensure that practices adopted for instance in management of essential medicines are effective.

The study also concludes that procuring, storage and distribution of essential medicines in public health facilities heavily rely on the financial resources available. For health facilities to adopt best practices in management of essential medicines the budgetary allocation must be sufficient. Finally, essential medicines and other basic amenities required to deliver quality healthcare require modern infrastructure, hence availability of infrastructure will always determine the management practices of essential medicines in health facilities.

5.4 Recommendations of the Study

5.4.1 Health Workers Training

Based on findings and conclusion from the research, the following recommendation were made; first, the Makueni County Government through its ministry of health in collaboration with its counterpart at national government should ensure that in-service training for health workers on emerging best practices in management of essential medicines. This can be achieved through organization of conferences and seminars purposely aimed at equipping the health worker with new knowledge on essential medicine management.

5.4.2 Policy and Institutional Framework

The study also recommends that county policy maker during the process of formulation of policies, rules and reforms in health sector should be done in participatory manner where health professionals at all levels are included. This will

increase awareness, conformity and adherence to set standards in management of essential medicines in health facilities.

5.4.3 Healthcare Budgetary Allocations

The study further recommends that top leadership with management of health sector systems should lobby with county budget committees to lobby for additional financing to enable them procure necessary infrastructures, equipment, facilities and technologies for storage and distribution of essential medicines. Increase budget allocation will guarantee health facilities advanced and modern technologies in management of essential medicines.

5.4.4 Available Infrastructure

The study further recommends that county health department should cooperate with the ministry of health of national and all the development partners to equip the health facilities with modern infrastructure to increase the effectiveness of the essential medicine management. The management of the health on other hand should conduct asset audit on the essential medicine management infrastructure and lobby the policy makers to increase funding for worn out and missing infrastructure necessary for effectiveness management of essential medicines.

5.6 Areas of Further Study

This study sought to determinants of commodity management practices of essential medicines in public health facilities in Kenya but only focused on Makueni County. At the period of the study, the county was piloting UHC hence had more resources compared to other counties hence further studies should focus on other counties in Kenya to bridge the contextual gaps. Further studies should focus on other

determinants of essential medicine management practices besides those addressed in

this study.

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Appendix I: Informed Consent

Kenya Methodist University

P. 0 Box 267-60200

MERU, Kenya

SUBJECT: INFORMED CONSENT

Dear Respondent,

My name is ………………..I am an MSc student from Kenya Methodist University. I am conducting a study titled: --

The findings of the study will be utilized to strengthen the health systems in Kenya and other Low-in- come countries in Africa. As a result, countries, communities and individuals will benefit from improved quality of healthcare services. This research proposal is critical to strengthening health systems as it will generate new knowledge in this area that will inform decision makers to make decisions that are research based.

Procedure to be followed

Participation in this study will require that I ask you some questions and also access all the hospital's department to address the six pillars of the health system. I will record the information from you in a questionnaire check list.

You have the right to refuse participation in this study. You will not be penalized nor victimized for not joining the study and your decision will not be used against you nor affect you at your place of employment.

Please remember that participation in the study is voluntary. You may ask questions related to the study at any time. You may refuse to respond to any questions and you may stop an interview at any time. You may also stop being in the study at any time without any consequences to the services you are rendering.

Discomforts and risks.

Some of the questions you will be asked are on intimate subject and may be embarrassing or make you uncomfortable. If this happens; you may refuse to answer if you choose. You may also stop the interview at any time. The interview may take about 40 minutes to complete.

Benefits

If you participate in this study you will help us to strengthen the health systems in Kenya and other Low-in- come countries in Africa. As a result, countries, communities and individuals will benefit from improved quality of healthcare services. This field attachment is critical to strengthening the health systems as it will generate new knowledge in this area that will inform decision makers to make decisions that are research based.

Rewards

There is no reward for anyone who chooses to participate in the study.

Confidentiality

The interviews will be conducted in a private setting within the hospital. Your name will not be recorded on the questionnaire and the questionnaires will be kept in a safe place at the University.

Contact Information

If you have any further questions you may contact the following supervisors:
1. Mr. Musa Oluoch
2. Dr Kezia Njoroge

Head of Department of Health Systems Management of Kenya Methodist University, Nairobi campus.

Participant's Statement

The above statement regarding my participation in the study is clear to me. I have been given a chance to ask questions and my questions have been answered to my satisfaction. My participation in this study is entirely voluntary. I understand that my records will be kept private and that I can leave the study at any time. I understand that I will not be victimized at my place of work whether I decide to leave the study or not and my decision will not affect the way I am treated at my work place.

Name of Participant………………………………………………………………….

Date…………………………..

Signature……………………………………….

Investigator's Statement

I, the undersigned, have explained to the volunteer in a language s/he understands the procedures to be followed in the study and the risks and the benefits involved.

Name of

Interviewer…………………………………………Date…………………….

Interviewer Signature…………………………………………

Appendix II: Questionnaire

This questionnaire is divided into six short sections that should take only a few moments of your time to complete. Please respond by ticking the appropriate box or filling in your answers in the blank spaces provided. This is an academic exercise and all information collected from respondents will be treated with strict confidentiality.

SECTION A: BASIC INFORMATION

1. Type of the health facility
   a) Level 5   [ ]
   b) Level 4   [ ]
   c) Level 3   [ ]
   d) Level 2   [ ]

2. Kindly Area of specialization
   a) Pharmacist   [ ]
   b) Procurement officer   [ ]
   c) Nurse   [ ]
   d) Laboratory   [ ]
   e) Clinical officer   [ ]
   f) Bio medics   [ ]
   g) Stores clerks   [ ]
   h) Others Specify

3. Highest level of education
   a) Postgraduate   [ ]
   b) Undergraduate   [ ]
   c) Diploma   [ ]
   d) Certificate   [ ]

4. Work Experience
   a) Below 2 years   [ ]

b)   3-5 years   [ ]

c)   6- 10 years   [ ]

d)   Above 10 years   [ ]

Section B: Health Worker Training

Kindly indicate the extent to which the following health worker training practices have

been adopted by health facilities in the county. Use the scale provided to respond to

the statements in this section

1. Have you undergone the following trainings

i.   Essential Medicine Management Training
        a) Yes [ ]
        b) No [ ]

ii.   Essential Medicine Demand Forecasting
        a) Yes [ ]
        b) No [ ]

iii.   Essential Medicine Needs Assessment
        a) Yes [ ]
        b) No [ ]

iv.   Essential Medicine Supply Chain Practice
        a) Yes [ ]
        b) No [ ]

2. How often do you undertake trainings in management practices of essential
   medicines
        a) Regurlarly   [ ]
        b) Quarterly   [ ]
        c) Semi-Annually   [ ]
        d) Annually   [ ]
        e) Rarely   [ ]
        f) Never   [ ]

3. Do you think health workers involved in essential medicine management requires
   relevant training in commodity management?
        a) Yes   [ ]
        b) No   [ ]

   Kindly, explain your position

_____

_____

___

4. Using a scale of 1-5 (5= Very satisfactory 1= Very Unsatisfactory) kindly rate your skills and knowledge in the following areas

Statements	1	2	3	4	5
Awareness of the essential medicine management cycle					
Commodity management skills					
Essential medicines Needs assessment skills					
Essential medicines supply chain					

Section C: Policy and Institutional Framework

Kindly indicate the extent to which the following policy and institutional framework practices have been adopted in the health facilities in Makueni County.

5. Does the County of Makueni have necessary supporting policies to enhance essential management practices adopted by health facilities?

   a) Yes [ ]

   b) No   [ ]

If Yes highlights some of the supporting policies that enhance essential management practices

_____

_____

_____

6. How do you rate the following in regard to how they support essential medicine management practices Makueni County using the scale provided.

	Very Inadequate	Inadequate	Moderate	Adequate	Every Adequate
County health policy					
Guidelines on management of essential medicines					
Standard Operating Procedures					
Separation of functions					

7. On a scale the scale provided indicate the extent to which policy and institutional framework affect the commodity management practices of essential medicines adopted by health facilities in Makueni County

     a) Very Large Extent   [ ]

     b) Large Extent   [ ]

     c) Moderate Extent   [ ]

     d) Low Extent   [ ]

     e) Very Low Extent   [ ]

Section D: Healthcare Budgetary Allocations

Kindly indicate the extent to which the following health care budgetary practices are faced by the organization.

8. Does your health facility has/get enough budget allocation to cater for essential medicine management activities?

    a) Yes [ ]
    b) No [ ]

9. How do you rate the following in regard to essential management in your health facility? Use the scale of 1-5 where 1=very insufficient and 5= very sufficient.

	Very Insufficient	Insufficient	Moderately Insufficient	Sufficient	Very Sufficient
Funds availability					
Amount allocated					
Timely disbursement					
Financing planning					

10. On a scale the scale provided indicate the extent to which Healthcare Budgetary Allocations affect the commodity management practices of essential medicines adopted by health facilities in Makueni County

        f)   Very Large Extent   [ ]

        g)   Large Extent   [ ]

        h) Moderate Extent   [ ]

        i)   Low Extent   [ ]

        j)   Very Low Extent   [ ]

Section E: Available Infrastructure
Kindly indicate the extent to which the following infrastructures have been implemented in the organization

11. How do you rate the available infrastructure at your health facility involve in following essential medicine management cycle

	Very Inadequate	Inadequate	Moderate	Adequate	Every Adequate
Procurement structures					
Storage structures and facilities					

Distribution channels					

12. Respond to the following statement on a scale of 1-5 (5 = Very Large Extent; 4 = Large Extent; 3 = Moderate Extent; 2 = Low Extent and 1= Very Low Extent).

Statements	1	2	3	4	5
Our facility has modern warehousing facilities for storage of essential drugs					
Our health facility has adopted latest ICT systems in management of essential medicines					
The faciltiy has up to date essential medicines distribution systems					
All the essential drugs are stored as recommended by manufacturers					

13. On a scale the scale provided indicate the extent to which available infrastructure affect the commodity management practices of essential medicines adopted by health facilities in Makueni County

        k) Very Large Extent   [ ]

        l) Large Extent   [ ]

        m) Moderate Extent   [ ]

        n) Low Extent   [ ]

        o) Very Low Extent   [ ]

Section F: Essential Medicines Management Practices
Kindly indicate the extent to which the following essential medicines management practices have been implemented in the organization.

14. How do you rate the essential medicine practices adopted by health facilities in Makueni County
    a) Effective   [ ]
    b) Ineffective   [ ]

    Explain your position

_____

_____

_____

_____

15. How do rate the effective of the following practices as felt in your health facility using the scale on a scale of 1-5 (5 = Very Adequate; and 1= Very Inadequate).

	1	2	3	4	5
Essential medicines Procurement practices					
Storage practices					
Distribution practices					

16. Does your health facility sometimes experience stock outs of essential medicines?
   a) Yes   [ ]
   b) No   [ ]

If yes, in "16" above mention some of the reasons why your health facility experience stock outs of essential medicines
   a) _____

   b) _____

   c) _____

   d) _____

   e) _____

Thank You for Participation

Appendix III NACOSTI Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR
SCIENCE, TECHNOLOGY & INNOVATION

Ref No: 378792

Date of Issue: 08/November/2021

RESEARCH LICENSE

This is to Certify that Mr.. Daniel Irungu Mwangi of Kenya Methodist University, has been licensed to conduct research in Makueni on the topic: DETERMINANTS OF COMMODITY MANAGEMENT PRACTICES IN PUBLIC HEALTH FACILITIES IN DEVOLVED HEALTH SYSTEM: A CASE ESSENTIAL MEDICINE IN MAKUENI COUNTY, KENYA for the period ending : 08/November/2022.

License No: NACOSTI/P/21/13811

378792

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR
SCIENCE, TECHNOLOGY &
INNOVATION

Verification QR Code

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Appendix IV Authorization Letter

REPUBLIC OF KENYA **GOVERNMENT OF MAKUENI COUNTY**

OFFICE OF COUNTY DIRECTOR HEALTH SERVICES
PO BOX 89-90300 MAKUENI
Email:countyhealthmkn@gmail.com   *contact@makueni.go.ke*
Website: www.makueni.go.ke

REF: GMC/DOH/CDH/GEN.II (140)   29th November, 2021

Daniel Irungu
HSM-3-3155-2/2010
Kenya Methodist University

RE: AUTHORIZATION TO COLLECT DATA IN MAKUENI COUNTY

Reference is made to the letter dated, 29th November, 2021 and NACOSTI /P/21/13811dated 8th November, 2021 regarding the above matter.

You are hereby authorized collect data on "*determinants of commodity management practices in public health facilities in devolved health systems*"

By a copy of this letter, SCMOHs and Medical Superintendents – are requested to accord you the necessary assistance for the success of your data collection.

Yours,

COUNTY DIRECTOR OF HEALTH
MAKUENI COUNTY
2 9 NOV 2021
P. O. Box 89 - 90300, MAKUENI.
Email: countyhealthmkn@gmail.com

Dr. Kiio S. Ndolo
Director Medical Services

- ECM –Health Services
- CO –Health Services
- Director(s) Health,
- SCMOHs & Med Sups

Appendix V University Approval Letter

KENYA METHODIST UNIVERSITY

P. O. Box 267 Meru - 60200, Kenya   Fax: 254-64-30162
Tel: 254-064-30301/31229/30367/31171   Email: info@kemu.ac.ke

28th October 2019

Commission Secretary,
National Commission for Science, Technology and Innovations,
P.O. Box 30623-00100,
NAIROBI.

Dear sir/ Madam,

RE: MWANGI DANIEL IRUNGU (HSM-3-3155-2/2010)

This is to confirm that the above named is a bona fide student of Kenya Methodist University. Department of Health Systems Management undertaking a Degree of Master of Health Systems Management . He is conducting research on, 'Determinants of commodity management practices in public health facilities in devolved health system: a case essential medicine in Makueni county, Kenya'

We confirm that his Research proposal has been defended and approved by the University.

In this regard, we are requesting your office to issue a permit to enable him collect data for his research.

Any assistance accorded to him will be appreciated.

Thank you.

Dr. John Muchiri. PHD.
Director Postgraduate Studies

KENYA METHODIST UNIVERSITY

P. O. BOX 267 MERU - 60200, KENYA   FAX: 254-64-30162
TEL: 254-064-30301/31229/30367/31171   EMAIL: INFO@KEMU.AC.KE

23rd October 2019   KeMU/SERC/HSM/77/2019

Mwangi Daniel Irungu
HSM-3-3155-2/2010
Kenya Methodist University

Dear Daniel,

SUBJECT: DETERMINANTS OF COMMODITY MANAGEMENT PRACTICES IN PUBLIC HEALTH FACILITIES IN DEVOLVED HEALTH SYSTEM: A CASE ESSENTIAL MEDICINE IN MAKUENI COUNTY, KENYA

This is to inform you that Kenya Methodist University Scientific Ethics and Review Committee has reviewed and approved your above research proposal. Your application approval number is KeMU/SERC/HSM/77/2019. The approval period is 23rd October 2019 – 23rd October 2020.

This approval is subject to compliance with the following requirements

I.   Only approved documents including (informed consents, study instruments, MTA) will be used.

II.   All changes including (amendments, deviations, and violations) are submitted for review and approval by Kenya Methodist University Scientific Ethics and Review committee.

III.   Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to KeMU SERC within 72 hours of notification.

IV.   Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to KeMU SERC within 72 hours.

V.   Clearance for export of biological specimens must be obtained from relevant institutions.

VI.   Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal

VII.   Submission of an executive summary report within 90 days upon completion of the study to KeMU SERC.

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://oris.nacosti.go.ke and also obtain other clearances needed.

Yours sincerely

Dr. A. Wamachi
Chair, SERC
Cc: Director, Postgraduate Studies

Appendix VI Health facilities Management Approval Letter